Some Madras Trees

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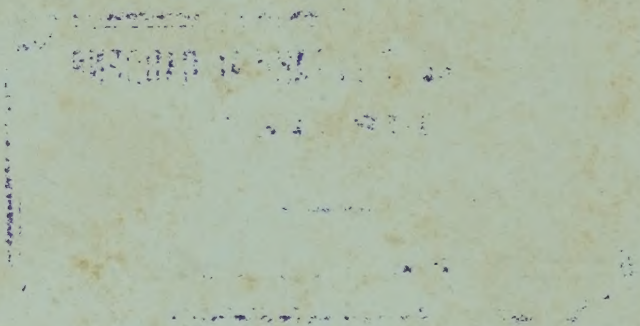

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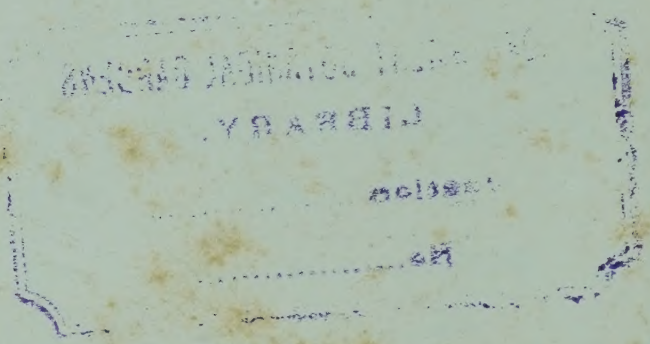

Some Madras Trees

BY

ALAN BUTTERWORTH
(Indian Civil Service, Madras)

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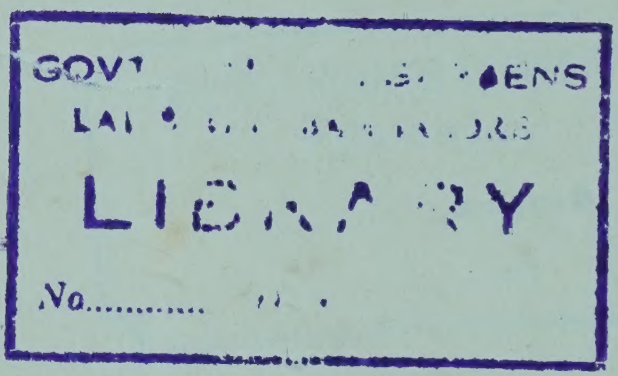

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PREFACE

THIS work is intended for the purely ignorant and especially for my younger brethren of the Civil Service, not because the epithet is particularly appropriate in their case but because of the great love and affection which I bear to them. Moreover they have begun to expect a favour at my hands and, though this book is not the boon for which they pant, it at least shows that I have their interests at heart and will thus encourage them to anticipate more material indications of my sympathy at an early date.

2. The scope of the book is restricted in several ways. In the first place it relates only to trees, that is to large plants with a single, distinct stem. Secondly, it has been compiled from notes made almost entirely in Madura and Madras and must therefore omit many trees common in the north and west and centre of the Presidency. Thirdly, it does not profess to deal with the forest trees (we greatly need a simple guide to them) but is mostly confined to those trees which one is likely to see when pottering about the compound or trotting precariously over the fine surface of our Local Fund roads. Fourthly, it is not a scientific work and is intended merely as a help towards identification.

Other deficiencies will be revealed in course of time to the diligent student and, in anticipation of such revelations, I now enter the plea that it is uncommonly hard to catch the general idea of a tree and sometimes even to describe the appearance of its trunk and leaves. Variations due to age, situation, nature of soil and innate vicious tendencies render accurate general descriptions more difficult than I expected when I set to work.

3. A total ignorance of botany in the reader being presupposed, a few elementary remarks about the structure of trees will not, perhaps, be out of place.

(1) The TRUNK consists (in the dicotyledonous trees) of a core of *pith*, surrounded by the *wood* which is, again, surrounded by the *cambium layer* (the wood-and-bark-producing layer) and that in turn by the *bark*.

(2) The LEAVES have next to be described and here I may refer to the system of classification which I have adopted.

The object of the book being simply to facilitate identification and leaves being nearly always available, I have classified the trees according to the nature of their leaves in the first instance. At the end of the volume they are re-classified according to the colour of their flowers and again according to the shape and size of their fruits, but the main classification is by leaves and the one thing essential for the purpose of this arrangement is to be able to distinguish between a simple leaf and a compound leaf.

The *simple leaf* consists of three parts, the *base*, the *stalk* (*petiole*), and the *blade* (*lamina*). The edge (margin) of the blade may be uninterrupted, in which case it is called *entire*, or it may be broken up in various ways. If the indentations of the margin are shallow, the margin is said to be *toothed* and the teeth may be pointed and directed outwards (*dentate*) or pointed and directed forward (*serrate*) or they may be rounded instead of pointed (*crenate*). If, however, the indentations are deep, the leaf is said to be *lobed* and the lobes (or *segments*) may be arranged in either of two ways ; that is to say, either (*a*) along the course of, and more or less at right-angles to, the midrib, when the leaf is called *pinnatifid* (*pinnatipartite* if the indentations reach nearly to the midrib), or (*b*) in such a fashion that they radiate, as it were, from the head of the stalk, when the leaf is called *palmatifid* (*palmatipartite* if the indentations reach nearly to the head of the stalk).

Now the *compound leaf*, on the other hand, consists, not of a single stalk bearing a blade, but, of a stalk out of which grow other stalks which bear leaf-blades and these subsidiary stalks with their blades form the *leaflets* of the leaf. The plain distinction between a leaflet of a compound leaf and a lobe of a simple leaf is that the former can, and the latter cannot, be detached from the main stalk without tearing any portion of the blade.

The leaflets of a compound leaf may be arranged along the common-petiole (or *rhachis*) or they may radiate from the head of the common-petiole. In

the former case the leaf is called *pinnate*, in the latter *digitate*. If, in a pinnate leaf, the common-petiole bears stalks to which several leaflets are attached instead of bearing mere leaflets, these stalks with their leaflets are called *pinnæ* and the leaf is said to be *bipinnate*. If such pinnæ, instead of bearing mere leaflets, bear stalks to which several leaflets are attached, such stalks and their leaflets are called *pinnules* and the leaf is said to be *tri-pinnate*. The stalk of the leaflet itself, however placed, is the *petiolule*.

A compound leaf may consist of only two leaflets; it is then called *bifoliolate*. In the case of some leaves consisting of three to five leaflets, the leaflets are so arranged that it is not easy to say at first sight whether the leaf should be called pinnate or digitate. I have, therefore, arranged such cases under a separate head and the classification of leaves adopted in the body of the book is—

(1) simple,
(2) bifoliolate,
(3) with 3 to 5 leaflets,
(4) pinnate,
(5) bipinnate,
(6) tripinnate,
(7) digitate.

The nature of the simple leaf and the compound leaf being understood, the difficulty is to make sure whether an apparent leaf is a leaf proper or only a leaflet. A very little practice enables one to distinguish them with ease in nearly every case and the following hints may be useful in cases of uncertainty. Let *x* be the stem as to which doubt is felt

whether it is a twig which bears leaves or a leaf-stalk which bears leaflets; then:—

(1) if there are *stipules* (explained in the index) at the base of *x*, it is a leaf-stalk bearing leaflets;

(2) a swollen base generally indicates that *x* is a leaf-stalk bearing leaflets;

(3) if *x* has flowers growing out of it, it is a twig bearing leaves;

(4) if, in the angle between *x* and a leaf-stalk attached thereto, a leaf-bud is found, then *x* is a twig bearing leaves.

The shapes of leaves and leaflets are very varied, even, sometimes, on the same tree. Before describing them, it is as well to call attention to the fact that in botany height is equivalent to distance from the main axis; so that the end of a dangling catkin which one would naturally call the bottom is botanically the top because it is most distant from the axis of growth. Hence the top or apex of a leaf is always the free end, whatever position the leaf may assume, and the base is the attached end.

The principal types of shape are the following:—

(*a*) *With a pointed tip*—the *lanceolate* type, where the leaf is narrow, tapers towards both ends but especially towards the apex and is widest towards the base;

(*b*) *with two sides more or less parallel*—the leaf ranges in width from the *acicular*, or fir-needle type, through *linear* to *oblong* which means something as like a mathematical oblong as a leaf is likely to be;

(c) *with a regularly curving margin*—this class ranges in width from the *elliptic*, through the *rotundate*, to the *orbicular*; it also includes the *ovate* or egg-shaped.

As a fact the difference between the *oblong* and the *elliptic* is often so small that in this work I have habitually used the former term to denote the narrowly-elliptic as well as the true oblong.

Leaves often do not conform exactly to any of the above types and, to express combination of types in the same leaf, the type-names are combined; thus, "ovate-lanceolate" describes a broad leaf, rounded at the base and broadest near the base but with the apex tapering to a point like a lance instead of being rounded like an egg.

(3) We can now turn to the FLOWER. This is composed of whorls of leaves which have undergone special modifications to adapt them to reproductive purposes. The point of the stem where a foliage leaf is given off is called a *node* and the intermediate portions of the stem are called *internodes*. The flower-leaves are given off in the same way from nodes in successive whorls but the internodes are nearly always so shortened that all parts of the flower seem to start at about the same level. The modified leaves forming the lowest or outermost whorl are called *sepals* individually and the *calyx* collectively. This whorl is generally coloured green but the next whorl is generally of some colour other than green; it is called the *corolla* and its constituent leaves the *petals*. Either the calyx or the

corolla may be suppressed. In that case the existing floral envelope is often called the *perianth* and the same word is also used collectively to denote the calyx and corolla together. The sepals may be fused and in that case we have a *calyx-tube*, the margin of which may be undivided or shallowly divided (toothed) or deeply divided (lobed). The petals may be similarly fused into a *corolla-tube*. The third whorl of floral leaves has undergone more profound modification. It forms the male reproductive organs each of which is called a *stamen* and consists of a stalk (the *filament*) bearing a head (the *anther*) wherein the pollen is manufactured. The stamens have marked instability in some species, tending to assume a petal-like type or to split up, and this tendency is taken advantage of in the production of "double" flowers. The innermost whorl of leaves forms the female generative organ which is called collectively the *pistil*. The nucleus of it is a leaf (called a *carpel*) which, by folding over, forms a sort of chamber (the *ovary*) wherein the immature seeds (*ovules*) develop. Certain cells of the carpel undergo a peculiar change of structure which enables them to hold the pollen-grains and to conduct their inner substance to the ovary. The portion of the carpel so modified is called the *stigma* and it is generally situated at the end of a stalk-like prolongation of the carpel which is termed the *style*. The position of the stigma on the style is often indicated by an enlargement of the style or by forking or by some other modification of shape. The pistil may

be constructed out of one carpellary leaf or out of several and in the latter case there may be several styles.

A flowering shoot may bear a single flower in which case the stalk is called the *peduncle*, or it may bear several flowers in which case the collection of flowers is termed an *inflorescence*, the common axis is generally called the *rhachis* and the stalk of each individual flower is called the *pedicel*. The forms of inflorescence are very varied but they may be reduced to two types, the *racemose* or *indefinite* and the *cymose* or *definite*. In the racemose inflorescence the shoot goes on growing, throwing out flowers laterally as it grows. In the cymose inflorescence the shoot ends at once in a blossom and the plant then devotes its flowering energies to the development of flower-bearing branches below that terminal blossom. It follows that in the racemose inflorescence the youngest flowers are towards the middle while in the cymose inflorescence the middle flower is the oldest.

The racemose type is divided into the following classes:—the *raceme* with simple stalks, each bearing a flower, growing up the axis; the *compound raceme* or *panicle* with branched stalks, bearing several flowers, growing up the axis; the *spike* with stalkless flowers growing up the axis; the *spadix*, a spike with a thick axis and generally a large, sheathing bract called the *spathe*; the *corymb* in which the axis is short and the lower flowers are on longer pedicels than the upper

so that all come to nearly the same level; the *umbel* in which the stalked flowers all radiate from the top of the axis; the *head* in which the axis bears at its end a number of stalkless flowers. The cymose type, too, is divided into classes but it is unnecessary to specify them. It may be noted that the word *panicle* is often used to denote a compound cyme as well as a compound *raceme*.

(4) Now as to the FRUIT. The ovary wall develops into the outer covering of the seed. This covering is called the *pericarp* and it may be hard or soft. It is sometimes differentiated into layers. Thus, in the stone-fruits, the inner part becomes hard while the outer part is soft. In such cases the hard inner part is called the *endocarp*, and it must not be confused with the *testa* or outermost coat of the seed which is often shelly or hard. The interior or kernel of the seed consists of the embryo which is often embedded in a substance known as the *albumen*. The embryo has one or two embryonic leaves and the number of these leaves is of great importance in classification, for all the plants with only one embryonic leaf go to form the great group of the *Monocotyledons*, while those with two such leaves form the still more important group of the *Dicotyledons*. The succulent portion of fruits is commonly composed of the pericarp but this is not always the case. In some instances the juicy and most conspicuous part of the fruit consists of a swollen perianth, flower-stalk or floral receptacle. The principal forms of fruit are the *follicle*,

legume, *capsule*, *nut*, *berry* and *drupe*. These words are explained in the index but, as the different forms represented by them are not always readily distinguishable, I have adopted at the end of the book a simpler, rough mode of arrangement according to shape and size.

4. A few words now as to the vernacular names. Both Tamil and Telugu possess copious and exact botanical vocabularies but, of course, except among tribes such as the Yânâḍis of Nellore who know every blade that grows, the majority of people know only a few names and through ignorance often give incorrect ones. I do not, therefore, guarantee the Tamil and Telugu synonyms appearing in this book. They are based in the main on the list issued by the Board of Revenue. This list I have checked as far as possible, in the case of the Tamil names, by personal enquiries, and, in the case of the Telugu names, by reference to Walter Elliot's "Flora Andhrica" (now, unfortunately, out of print) and to notes made by Mr. E. Scott, I.C.S., and kindly lent by him for the purpose.

5. I take the opportunity to express my thanks to all who have helped me and must mention in particular the obligation I am under to Dr. C. A. Barber, Sc. D., F. L. S., Mr. N. Ramalingam Nayakkar, Maistry at the Agri-Horticultural Gardens, Madras, and Mr. A. K. Appaiya, Forest Range Officer.

In the course of the work reference is made frequently to Sir Dietrich Brandis' "Indian Trees"

and occasionally to Mr. Gamble's "Manual of Indian Timbers", Colonel Drury's "Useful Plants of India" and a few other books.

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Simple Leaves

Some Madras Trees

SIMPLE LEAVES

DILLENIA INDICA (or *speciosa*)—(*Dilleniaceæ*)
Tamil, Uvva, Nâytêkku—*Telugu*, Uvva,
Peddakaḷinga.

Described by Gamble as a large tree and by Brandis and Drury as a moderate-sized one. I have not seen it more than 4 feet in girth and about 25 feet high. It is to be found in gardens in Madras and its handsome foliage attracts attention. The trunk is short. The under-bark is red, covered with a green skin which has a smooth, silvery coating. The skin peels off readily.

The **leaves** cluster, closely set and at varying angles, at the ends of the stout, downy twigs and serve to identify the tree at once. They grow on downy, stem-clasping, deeply-grooved petioles about 3 inches long, the blade attaining a size of about $1\frac{1}{3}$ feet long by 5 inches broad. They are oblong and somewhat pointed and regularly and clearly serrated, each tooth being at the end of a lateral vein. Of these veins there may be about 50 opposite or sub-opposite pairs, well-marked on the under surface of the blade and leaving the midrib at an angle of about 45 degrees. The veins being depressed on the upper surface of the leaf, it has a noticeably ribbed or wrinkled look.

Roxburgh writes enthusiastically of the great and noble **flower,** 9 inches in spread. I have unfortunately never seen it in full bloom, all the flowers on the tree I am now watching dropping off when only half blown. There are 5 green or greenish-white sepals which are some 3 inches long, almost as broad, stiff, thick, deeply concave. The 5 white petals run to about 3 inches long by 2 inches broad. The stamens are in two rings; the outer consists of a thick fringe of innumerable, linear, upstanding ribbons about three-quarters of an inch long, the yellowish anthers forming more than half the length : the inner ring contains but one series of stamens, which are longer than the constituents of the outer ring and have the attitude of erect cobras. Within and overtopping this inner ring rises a stout, conical, ribbed body crowned by a spreading, stiff, white plume. The conical body is the receptacle; the ribs consist of carpels adherent thereto and the plume is composed of the fleshy, oblanceolate styles, of which there may be more than 20. The flower has a slight fragrance.

The **fruit** which is edible is a large, roughly-globose body about $1\frac{1}{3}$ feet round and yellow when ripe. The main portion of the fruit is formed of the greatly enlarged, hard and very thick sepals, which cover the surface with great scales of unequal size and overlap to form a fleshy envelope to the ring of carpels which surrounds the thick axis. These carpels contain numerous small seeds embedded in a gelatinous substance.

POLYALTHIA (or *Guatteria*) LONGIFOLIA (*Anonaceæ*)

Tamil, Asôka, Asvatti, Neṭṭilingam—*Telugu*, Asôkam.

(Foreign)

Very common in Madras as an avenue tree. Brandis says that it is indigenous in Ceylon but it is apparently an exotic here. A slender, graceful tree with a smooth, brown bark; the largest measured by me was 4½ feet in girth and about 50 feet high. The branches are generally short and have a tendency to grow out horizontally and to be roughly whorled.

The tree is easily known by the unusual waviness of the edges of the **leaves** which are abundant, alternate and generally drooping and have very short petioles. They are very long, narrow and tapering; commonly about 6 or 7 inches by 1 inch but occasionally up to 10 by 2 inches.

The **flowers** grow thickly in short-stalked or sessile umbels. The pedicels are slender, an inch or less long, generally bearing a small, spathelike growth. The three sepals are short, broad and green. The petals are a greenish-yellow or yellowish-green, narrow, pointed, 6 in number, growing in double a series, star-ray-like when fully opened, the total spread being then an inch or less. The anthers (there are no filaments or practically none) form a stout, low ring round the short pistil.

The **fruit** is peculiar. From the head of a stout stalk an inch or more long, grows a cluster of shiny, ellipsoidal bodies on stiff stalks about half an inch

long. These bodies are about three-quarters of an inch in length and they contain a single, large, silvery seed. The cluster may contain a dozen or more of these berries and the whole cluster arises from a single flower, each of the fruits consisting of a single carpel of the pistil which in this curious way breaks up into its component parts. When ripe these berries have a brownish-purple skin and the flesh surrounding the seed is yellow.

I have seen or heard somewhere that the leaves drop off this tree if it is touched by a perfectly modest woman, but the result of experiments with the aid of carefully selected lady-friends disposes me to doubt whether the story is true.

ANONA SQUAMOSA (*Anonaceæ*)

Tamil, Sîtâ—*Telugu*, Sîtâ—*English*, Custard apple.

(Foreign)

More often a large, straggling shrub than a small tree.

It is not easy to describe it so as to make it recognizable when not in fruit. The **leaves** are simple, alternate, of a dull, dark green. In shape they are ovate-lanceolate or oblong-lanceolate and in size they run to about 4 inches long.

I used to have a tendency to confuse it with the guava, but it can be readily distinguished from that tree by the disagreeable smell of the bruised leaves which somewhat resembles that of ivy.

The **flower** is curious. There is a very small, triangular calyx. Then come 3 pointed, fleshy petals about three-quarters of an inch long,externally green, internally whitish with a purple, semi-circular patch at the base (If there happen to be six petals, three of them will be minute). The interior of the flower is occupied by a white mass consisting of very numerous stamens surrounding a hemispherical torus (floral receptacle).

The **fruit** (a mass of united carpels forming a berry) is too well known to need description. Some people like it in spite of its excessive sweetness and the trouble of spitting out the seeds, but it is certainly not to be compared with the nougat-like fruit of the cheramoya, another member of the same genus, which grows in Ceylon.

The custard apple is usually abundant about ancient forts. The Muhammadans seem to have had a particular *penchant* for the fruit.

BIXA ORELLANA (*Bixaceæ*)

Tamil, Jâfra, Kuragumanjal—*Telugu,* Jâfra.

(Foreign)

A shrub or a small tree with a short trunk and smooth, brown bark; not often seen but, when seen, the flowers and fruit will attract attention.

The **leaves** are alternate, slightly cordate, acuminate, smooth, in size up to about 6 by 4 inches. The petiole is slender and nearly 3 inches long.

The **flower** has a very small calyx and 5 narrow petals with a spread of an inch or two. The petals are of a pretty pink colour or else white slightly tinged inside with lilac. The stamens are long, very numerous and slender, soft as swan's down, yellow at the base, pink towards the tips and bearing lilac or pink anthers. The pistil is pinkish.

The **fruit** (a capsule) is peculiar. In shape it resembles the broad, pointed beak of a bird and especially so when it gapes. In length it may be about 2 inches and in breadth (at the base) over an inch. It is greenish-red in colour and is covered with red hairs. The interior is filled with scarlet seeds which leave a bright red stain when handled.

Calophyllum inophyllum (*Guttiferæ*)

Tamil, Pinnai—*Telugu*, Ponna

The singular beauty of the foliage accounts for the generic name.

A common tree in gardens—small to moderate in size with smooth, gray or brown bark.

The **leaf** forms a beautiful ellipse with very numerous, delicate veins almost at right angles to the midrib, which is yellowish ; it is dark, glossy, sometimes slightly emarginate, in size up to about 7 by 4 inches, in appearance like the India-rubber tree leaf though on a smaller scale. The petioles are short and the leaves are opposite and decussate.

The **flowers** grow in groups of racemes which are remarkable in that their stalks are white. There

are four waxy, white sepals—two being petalloid in appearance—four waxy, white petals and a crowd of yellow stamens surrounding the little pink ball of the ovary with its long style. The flower is about an inch across, pretty and very sweet.

The **fruits** which are drupes hang in bunches on pedicels an inch or so long; they are smooth, spherical, about 4 inches round, oily and contain a large seed in a round, shelly stone. When ripe the fruit is yellowish but it is more often seen in the green stage.

HIBISCUS TILIACEUS (or *Paritium tiliaceum*)
(*Malvaceæ*)

Tamil, Châpâttu Cheḍi (?)

A small tree or shrub. Gamble states that the bark is gray, but I have noted it as dark and rough. The young shoots are downy.

The **leaves** cluster to the ends of the boughs on petioles running to about 5 inches. They are whitish underneath but the petioles and the veins underneath are often pinkish. The very young leaves are downy and of a pale claret colour. At the base of the midrib, and occasionally at the bases of the two adjacent basal veins, there is a long gland which is sometimes pink in colour. The radiating veins may number eleven. There are large, deciduous, leaf-like stipules. The leaves are alternate, deeply cordate, rotundate or orbicular, acuminate. Their margins are slightly crenate, most markedly so towards the apex. The blade grows to about 8

by 6½ or 8 by 8 inches. It turns yellow before falling.

The **flowers** are regally adorned. They grow in few-flowered racemes and measure about 2 inches in length and more in spread. The calyx is supported by a whorl of 10 small pointed "bracteoles" much shorter than the sepals, which are green or purplish, pointed and about three-quarters of an inch in length. The petals (5 in number) overlap and are in colour primrose-yellow but, internally, at the base, of deep crimson. The staminal column is over an inch long. From it project numerous white, anther-bearing filaments and it is crowned by the deep-crimson tips of the 5 styles.

Brandis remarks that the flower turns red in the evening, so it presumably lives only for a day.

The **fruit** is a capsule which when young is enclosed in the sepals. Later the whole thing turns brown and opens into 5 valves with a spread of an inch or so. Each valve contains two cells and each of these contains a row of little, dark seeds. Before opening the capsule is yellowish, velvety, almost spherical but with a point at the end, and about three-quarters of an inch long.

Thespesia populnea (*Malvaceæ*)

Tamil, Pûvarasu—*Telugu*, Gangarâvi, Gangarêni, Munigangarâvi, Jôgirâgi—*English*, Portia (a corruption of the Tamil), Tulip tree.

I have heard the scientific name translated as

"the People's Thespesia" but cannot commend this rendering. The Tamil name "flowering sacred-fig" is due to a slight resemblance between the leaves of the two trees. So far as I am aware the tree is never seen wild down here and it is said that it will not grow from seed. The books, however, do not speak of it as an *extra*-Indian tree. It is extremely common in avenues and gardens.

It has a rough, brown bark, often very knobby and gnarled; in fact it has commonly a deformed, ill-grown look and the trunk is often decayed; an ugly tree on the whole.

I have seen it over 10 feet in girth but it is usually only of medium size.

The **leaves** are large, noticeably cordate, tapering to a long point. They may be 8 by 6 inches.

The redeeming feature of the tree is its extremely pretty **flower**. There are 5 large (about 2 inches long), overlapping (imbricate), yellow, crinkly petals curiously suggestive of paper flowers. At the inner base of each is a crimson blotch. The numerous yellow anthers grow, in the usual mallow fashion, out of the staminal tube which encases the lower part of the long style. The flower turns pinkish when dying.

The **fruit** is a capsule at the base of which appears the brownish, undivided calyx. It is depressed-globose in shape, nearly 1 inch in diameter, when old blackish, when younger full of a yellow, milky juice. The seeds are numerous and packed into five compartments.

PTEROSPERMUM SUBERIFOLIUM (*Sterculiaceæ*)

Tamil, Taḍa Sembolagu—*Telugu*, Taḍa, Lôluga.

This rather handsome tree is pretty common I believe, though I do not remember to have come across it often. It is a comfort to describe a tree which can be recognized at a glance like this one. There is no mistaking the hoary under-surfaces of the leaves and their quite remarkable shape.

The tree grows big, certainly to a girth of 12 feet and a height of about 60. The bark is light-brown and smooth, though sometimes cracking and peeling a bit. The trunk is sometimes irregular in shape and the ends of the boughs may be drooping. The branchlets and petioles bear a fine down of a slightly tawny colour.

The **leaves** are alternate and set in the same plane pretty close together. The petioles are short, under half an inch. The upper surface of the blade is dark, glossy green; the under surface is slightly downy and almost quite white, but the down on the under side of the veins is light-tawny or yellowish. In size the blade generally runs to about 5 by 3 inches but I have seen it 7 by $3\frac{1}{2}$. The shape is peculiar and not easy to describe. From a rounded base, the margins either gradually spread outwards or run practically parallel for a varying distance but generally for more than two-thirds of the total length; they then contract sharply to the long acumen and, in doing so, generally become markedly and irregularly dentate. The number

of teeth varies. Sometimes there is only one tooth on each side at the widest part of the leaf and the margin is thereafter entire in its abrupt contraction towards the apex. In other cases there may be a varying number of teeth on each side of the acumen but I have never seen more than four teeth on one side of it.

The **flowers** grow, solitary or in groups of 2 or 3, on short stalks in the axils of the leaves. The bud is somewhat hairy and about three-quarters of an inch long. The calyx has 5 long, narrow, pointed lobes which bear a white, silky down, are about an inch long and curl downwards. The 5 petals are white and have a total spread of about $1\frac{1}{4}$ inches; they curve outwards and then inwards, giving the lower part of the corolla a sort of urn-shape, before they spread out in the ordinary way. There are 5 long, downy staminodes and 15 short stamens with brownish, linear anthers; these stamens are united at the base into a column. The style is about as long as the staminodes (say half an inch) and has a club-shaped, yellowish stigma.

The **capsule** is velvety and whitish-brown in colour. It grows on a short stalk and reaches 2 inches or so in length and about the same in girth. It is cylindrical but contracted to a narrow neck at the stalk end. At the apex too it is pointed but only slightly. The five constituent valves are clearly indicated. The capsule is hard and woody. The seeds are yellowish, each bearing a long, transparent wing, and they are packed closely against the dissepiment or partition attached to each valve.

GUAZUMA TOMENTOSA (*Sterculiaceæ*)

Tamil, Tênpûchimaram, Kambiḷimaram—*Telugu*, Rudrâksha—*English*, Bastard cedar.

(Foreign)

This tree, very common in Madras, may be called "the cumbly tree" as well as anything; the name is certainly more appropriate than "Bastard cedar" which I never heard used. It is easily recognized by the shape and feel of the leaves. The tree is of moderate size, never tall, though I have seen it over 7 feet in girth. The bark is generally cracked and rough, brown in colour but sometimes grayish. Generally it is a starved-looking tree. The boughs are sometimes drooping and the branchlets are downy.

The **leaf** is flexible; very rough to the feel, whence its Tamil name "blanket tree"; closely serrated; ovate-lanceolate or oblong-lanceolate, tapering and generally acuminate; cordate; generally markedly unequal-sided; sometimes large, up to 9 by 6 inches.

The small **flower** is peculiar. There are 5 green sepals; 5 incurving, concave, yellow petals (forming the claw), each bearing 2 long, purplish or yellow, thread-like awns (forming the lamina); 5 small stamens alternating with 5 staminodes and forming with them a column. The general appearance of the flower is a small, yellow ball surmounted by a tuft of purplish or yellow hairs. The flowers are abundant and grow along the branchlets in limp,

axillary, branching cymes which are generally under an inch in length.

The **fruit** is an ovoid, cylindrical or almost globular body, about an inch long and nearly as broad. When young it is green covered with closely set tubercles. Later it turns black and looks somewhat like a mulberry. In this state it is eaten by boys, bats and donkeys, a slight sweetness compensating to them for its woodiness. The skeleton of the fruit is curious, an open-work wooden design decorated with spikes and enclosing five chambers.

MELOCHIA VELUTINA (or *Visenia umbellata*)
(*Sterculiaceæ*)
(Probably foreign)

A small tree with a smooth bark, grayish on the surface, dark-green below. The ends of the shoots and the petioles are rather hairy or downy.

The young **leaf** has on the upper surface a dense, white plush which gives it a distinctly velvety look and feel. The older leaves have the same characteristic in a much less marked degree; their lower surface is harsh with short hairs. The leaves are large and limp, growing on slender petioles about 4 inches or less in length; they are alternate and set on at various angles. In shape the leaf is broadly ovate-lanceolate; in size it grows to about 7 by 6 inches; the margin is serrated, rather irregularly; there is a short point at the apex; the base is more or less square-cut in the young leaf; while in the older leaf it has a rounded-cordate form. I have

always found 5 basal veins, but Brandis says there are 5 to 7.

The **flowers** grow in stiff, axillary or terminal, corymbose panicles 2 or 3 inches long. These panicles are sometimes so grouped as to look like a single, branching panicle of 8 inches or so in length. The inflorescence is downy. The blossoms are small and numerous. The greenish calyx-tube is divided into 5 lobes with down-turned points. The petals have the remarkable characteristic of withering without falling so that one finds them, as well as the calyx, attached to the fruit; they are 5 in number, square-ended, of about the same width throughout, in colour a pretty pale-pink turning to brown when withered. The 5 stamens are yellow and attached together at the base. The 5 styles also are yellow and are feathery and much longer than the stamens.

The **fruit** is a capsule about one-third of an inch long and turns to a sort of tawny colour. It is divided up lengthwise by 5 high, narrow, slightly hairy ridges and often shows traces of the styles at the top. Each of the 5 compartments of the capsule seems to contain a small, black seed bearing a wing on one side.

KLEINHOVIA HOSPITA (*Sterculiaceæ* or *Byttneriaceæ*)

Tamil, Puntêkku.

(Foreign)

This is found in Madras gardens. I have not

635.9
BUT

noticed it elsewhere. The smooth, light-brown trunk is decidedly like that of the teak and hence the Tamil name. I am told that the roots tend to spread and throw up new stems. It is of moderate size and has those large, simple leaves which so many trees possess and which often have such a general resemblance as to render identification by means of the foliage difficult.

The **leaves** are alternate, with slender, green petioles which run to 8 inches long; they vary much in shape, having sometimes pointed and sometimes rounded apices and being sometimes almost reniform (kidney-shaped). Generally it may be said that they are very broadly ovate and slightly cordate. In fact they are sometimes broader than long; the leaf, for example, may run to 9 by 9 inches or 7 by 9 inches. They are flabby, thin and smooth.

The **flowers** are very small, pink, growing in terminal panicles. There are 5 long, soft, pink sepals and 5 petals closely alike in appearance. The staminal tube which is whitish and rather long and stout opens out into 5 teeth and surrounds a gynophore.

The **fruit** is curious. It is an almost-transparent, papery, weightless, green to brownish, 5-lobed, star-shaped, inflated capsule about an inch across and forms an interesting and clear example of the development of the ovaries from leaves. The capsule usually contains only 2 or 3 small seeds growing at the common junction of the walls or dissepiments (axile placentation). Most of the chambers are generally empty.

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BERRYA AMMONILLA (*Tiliaceæ*)
Tamil, Tirukannamaram—*English*, Trincomallee wood
(Foreign ?)

This tree is common in Madras and is occasionally seen elsewhere. It is not apparently found wild in this Presidency. It is of moderate size, slender in growth, with a smooth, light-brown or grayish bark and short boughs. The petioles are slender, green, up to four inches or so in length.

The **leaf** is smooth and generally ovate-lanceolate and acuminate but sometimes rotundate or elliptic-lanceolate or even oblong-lanceolate. It is generally cordate. The blade runs to about 10 by 7 inches. There is often a pair of thread-like stipules about a third of an inch long at the base of the leaf. The margin is sometimes slightly and irregularly crenate or dentate, is somewhat wavy and is often ragged.

The **flowers** grow in large, stiff, many-flowered, terminal panicles with wide-spreading branches whereof the lower ones are in the axils of leaves. They are slightly fragrant and have a spread of about half an inch. The calyx has 2 or 3 irregular segments, the corolla consists of 5 or 6 (sometimes 7 or 8) oblong, white petals and there is a host of little yellow-headed stamens.

The **fruit** is a capsule. It may be reddish-green or brown in colour. It has 6, 8, or 10 papery wings arranged in 3, 4, or 5 groups; these wings extend round the fruit with a total spread of an inch or more and cause it to spin as it falls.

GENUS CITRUS (*Rutaceæ* or *Aurantiaceæ*)

There are so many sorts of Citrus (oranges, limes, lemons, citrons, and pomelo) that I do not propose to try to distinguish each variety. It seems enough to allude to the general characteristics of the genus. Those who want to study the subject in detail can refer to an article in "The Indian Forester" for June–July 1910.

They are small trees with a smooth, but sometimes knobby, bark which in colour is usually dark with a greenish tinge. They generally bear thorns, both short and long, and these grow in the axils of the leaves.

The **leaves** are generally rather dark, elliptic or ovate, sometimes bluntly pointed, smooth, rather shiny, slightly crenate, often freckled with white. There are three peculiarities which generally serve to identify the leaf. In the first place it is fragrant when bruised. Secondly, when held against the light, it will be found to be dotted with minute, transparent vesicles which contain a sweet-scented oil and which form a marked ring along the margin. Thirdly, the petiole in some varieties has wings which broaden towards the blade and which are sometimes so large that it looks as if there were two leaves, the bigger one growing out of the top of the smaller. These wings are said to represent lost leaflets, the original type of the leaf being trifoliolate.

The **flowers** are white (said to be sometimes tinged with red) and scented. The small, green

calyx tube is toothed. There are 4 or 5 narrow petals, numerous yellow-headed stamens and a stout style. The petals are dotted with transparent glands.

The **fruits** (berries) need no description. The Tamil and Telugu names are numerous; Nârttai, Yellimichchi, Kichchili, Kamala, Pombala, Bamblimâs, Nâranga, Kolinji, Kollimichchi, Nârttangâ, Koḍiyellimichchi, Kasappunârttai, Koḍinimma, Nimma, Mallakârangi, Nârîjâ, Nâringa, Âranji, Tiyyanimma, Pamparapanasa, Pamplimâsi.

ELÆODENDRON GLAUCUM (or *Roxburghii*)

(*Celastraceæ*)

Tamil, Irukûli, Karukkuvâchi, Karuvâli—*Telugu*, Nerija, Nerasi, Bûtigi, Nirasi, Mûkûrti.

A large, handsome tree; not very common. It is characterized, *inter alia*, by its slender, drooping branchlets.

The trunk is stout and irregular in form, being sometimes flattened or angular. The bark smooth (sometimes pimply or wrinkled), grayish-brown externally, crimson internally.

The **foliage** is abundant, the leaves being opposite and decussate and growing close together on slender stalks an inch or less in length. The blade runs to about 4 inches long and is elliptic (but tapering slightly towards both ends), crenate, smooth and glossy.

The **flowers** grow in short, axillary cymes, the stalks of which are repeatedly sub-divided into pairs until, as a rule, the number of 16 pedicels is arrived at. Flowers are sometimes, though not always, found in the forks of the branches of the cyme. The flowers are minute and very inconspicuous. The calyx is barely discernible. There are 4 or 5 narrow, green petals and (4 or ?) 5 small stamens inserted under the edge of disk and bent downwards between the petals.

The **drupe** is about half-an-inch long, broadly-ellipsoid and yellowish when ripe and contains a hard stone.

ZIZYPHUS JUJUBA (*Rhamnaceæ*)

Tamil, Elandai—*Telugu*, Rêngu, Rêgu, Ganga, Rêvi, Rêgi, Rêni, Bôre, Bâre—*English*, Jujube tree.

A common tree and readily identified by its thorns which may be either solitary and curved or in pairs, in which latter case one is straight and points outward and the other is curved backwards.

It is commonly small, trees exceeding 3 feet in girth being rare. The bark is brown and rough, the ridges being often wavy, making a sort of criss-cross pattern. The boughs droop; the branchlets are downy and zigzagging.

The **leaves** are alternate and have 3 basal nerves or veins. They are elliptic or rotundate, generally only an inch or so long and practically sessile. The upper surface is glossy: the under surface bears a white or tawny down.

The **flowers** are fragrant, minute, growing in little clusters on a very short stalk. There is a greenish calyx-tube divided into 5 lobes and between each of these is an almost imperceptible white or yellow petal curving outwards and downwards, The centre of the flower is occupied by a ten-lobed disk.

The **fruit** is a globose drupe about three-quarters of an inch in diameter, closely resembling a small crab-apple. When ripe it is yellow or somewhat orange-coloured. It contains a tuberculate stone. The fruit is eaten : it is slightly sour but mealy and tasteless.

ANACARDIUM OCCIDENTALE (*Anacardiaceæ*)

Tamil, Mundirikoṭṭai —*Telugu,* Muntamâmiḍi, Jîḍimâmiḍî—*English,* Cashew nut.

(Foreign)

A small tree, very common in some places and especially perhaps in S. Canara. I have seen it nearly seven feet in girth but it is always a low and wide-growing tree. The branches often droop till the ends trail on the ground. The trunk is smooth and grayish.

The **leaves** are alternate and tend to cluster at the ends of the branchlets. The petiole may be nearly an inch long. The blade is of lightish green colour; conspicuously marked with veins taking off from the midrib; stiff; up to 6 inches or so in length by about 3 in width; somewhat obovate; the end rounded and sometimes slightly emarginate

or almost square cut (this abrupt, broad end is a conspicuous feature of the leaf).

The **flowers** grow in large, stiff, branching, terminal panicles. They are fragrant and about one-third of an inch across. The calyx-tube is green and 5-lobed. There are 5 narrow, down-curving petals, yellowish-green streaked with crimson. The general effect is that the flower is pink. There are both male and bi-sexual flowers mixed up together.

The **fruit** is the unmistakable feature. There is a kidney-shaped, brownish drupe, an inch or so long, seated quaintly on what looks like an apple coloured a gay yellow or red. This apple-like fruit consists of the swollen flower-stalk. I once tasted one which had a flavour of strawberry but generally, though juicy, the fruit is too astringent to be good.

The fried seed is the familiar "promotion nut" of hopeful juniors, but something much more powerful is required to clear the present block in the Civil Service.

MANGIFERA INDICA (*Anacardiaceæ*)

Tamil, Mâ, Mâm—*Telugu*, Mâmiḍi, Mâvi—*English*, Mango.

I mention the mango only to caution the novice not to be too certain that he knows it. Many a worthy fellow has been stricken with enduring shame by mistaking *Bassia longifolia* for it. I have tried to bring out the differences under *Bassia*. There is, however, no fear of a mistake when the mango

is in flower or fruit. The largest mango I have measured was seventeen feet in girth and the wild mango is often a fine, tall tree.

SEMECARPUS ANACARDIUM (*Anacardiaceæ*)

Tamil, Shêrankoṭṭai, Senkoṭṭai, Kalkambi—*Telugu*, Jîḍi, Nallajîḍi—*English*, Marking-nut.

I have no notes about the general appearance of this tree which is not commonly met with, outside the forests at all events. Gamble says that the bark is dark-brown, rough, exfoliating in very irregular patches. Brandis describes it as a middle-sized tree with soft wood and a short, rather harsh down on the branchlets and other parts.

The **leaves** are alternate on thick petioles about one-and-a-half inches long. The blade, as seen by me, runs to about 15 by 6½ inches but it apparently grows considerably larger. Underneath it is whitish and slightly downy. The lateral veins fork towards their ends. The leaf is generally oblong or slightly obovate.

The minute **flowers** are in thick clusters along the spike-like branches of an erect, compressed, downy, terminal panicle which may be a foot or so long. These branches grow in the axils of leaves which, towards the top, become short, stout, downy, linear bracts; they bear narrow, pointed bracts below the clusters of flowers and are an inch or so in length. The axis of the inflorescence is stout and the pedicels are very short, the flowers

being almost sessile. There seem to be, usually, 6 green calyx-lobes and 5 petals which are green with a whitish border. There are, in the male flower, (5 or 6) projecting stamens with large, double, white anthers.

The **fruit** is remarkable. The pedicel and base of the calyx thicken to form a large, fleshy cup from which the true fruit projects; this fruit is a drupe, flattened on two sides, irregularly oval in outline, slightly notched on one side of the apex. The drupe and cup together reach a length of about one and-a-half inches. When young the fruit is dark green, when old the cup turns bright orange and the drupe purplish black. The latter contains an oily juice which leaves a long-lasting black stain and for this and other reasons should be dealt with cautiously. Drury ('Useful Plants') gives a full account of the various properties of the tree. The hypocarp or cup is described in the books as edible. It is extremely astringent raw but should, apparently, be dried or roasted before eating.

BAUHINIA RACEMOSA, etc. See under Bifoliolate leaves.

TERMINALIA ARJUNA (or *glabra*) (*Combretaceæ*)

Tamil, Marudai — *Telugu*, Maddi, Tellamaddi, Peddamaddi.

A particularly striking tree, one of the handsomest we have and very fairly common. The trunk is shapely, unusually smooth, greenish-white (almost

white) in colour. It throws out large buttresses and grows to a stately size. I have seen it over 20 feet round above the buttresses and one specimen was 34 feet, measuring round the buttresses. Once the foliage is known, the tree can easily be distinguished by it on account of the evenness in width and abruptly rounded two ends of the **leaves** which are oblong or elliptic. They are opposite, or sub-opposite, smooth and often very slightly crenate; sometimes the leaf is slightly cordate or emarginate and approaching the obovate form. It turns red before it drops. The petiole is very short. Sometimes the blade is over 9 inches long but generally it is about 5 or 6 by 2 inches. There are two glands just at the base of the blade.

The **flowers** have a disagreeable smell. They grow sessile, in fascicles (or clusters), along stalks which may be 3 or 4 inches long. These stalks grow in groups forming a sort of raceme of spikes of which the lowest are axillary. There are no petals. The calyx-tube is dirty-white in colour, has 5 wide-spreading, pointed lobes and contains a white wool. The stamens number 10. The total length of the flower is under a quarter of an inch and more than half of this length is contributed by the stamens which, with their yellowish anthers, form the most conspicuous part of the flower. The style is slender and tinged with pink.

The **fruit** is described as a drupe but departs widely from the standard stone-fruit type. It is nearly 2 inches long and easily distinguished by its 5 high

longitudinal ridges or wings. The thin pericarp covers a very hard stone.

TERMINALIA BELERICA (*Combretaceæ*)

Tamil, Tâni—*Telugu*, Tândra, Tâḍi—*English*, Beleric myrabolan.

This large and rather handsome tree is fairly often seen in gardens in Madras; it is also a forest tree. Gamble describes the bark as bluish-grey, but in specimens seen by me it was brown and broken. The branchlets tend to hang down and are tufted with leaves. The roots sometimes spread flat round the foot of the tree forming a sort of plinth.

The **leaves** are sometimes opposite, sometimes alternate, and sometimes tend to verticillation (whorling.) The petioles are stout and run to 4 inches or more. The blades are thick, harsh, dull, broadly elliptic or rotundate or obovate, sometimes slightly emarginate, up to 7 or 8 inches by 5 or 6. The general effect of the foliage is grayish blue or bluish green. Roxburgh's remark that there are two glands on the petiole seems to be a mistake.

The **flowers** which are small grow in stiff, simple spikes which are grouped round the young shoots and may be 6 inches or so in length. There are no petals. The 5-toothed calyx-tube is greenish yellow and filled with a yellowish or whitish wool. The 10 stamens are yellowish with stiff, slender filaments and large, round anthers. The flowers have a sweet but nauseating smell. (Note that

chebula has panicled spikes while *catappa* and *belerica* have simple spikes).

The **fruit** (a drupe) is either roughly globular with a certain tendency towards a 3-sided form or it is flask-shaped, that is, has a distinct neck and then swells into a spherical body. This difference in shape seems to depend on the age of the fruit which is light-brown in colour but covered with a close, white velvety down, grows to about 1½ inches long by nearly 4 round and has a very hard stone.

TERMINALIA CATAPPA (*Combretaceæ*)

Tamil, Vâdam—*Telugu*, Bâdam

English, Indian almond.

(Foreign?)

This is one of the four whorled trees referred to under *Ailanthus excelsa*. The tree is very common in inhabited places though apparently it is an introduced species. There is no mistaking it; the whorls of branches run out horizontally at considerable intervals so that the foliage is in shallow, widely-separated rings. The trunk is brown, the bark sometimes broken but not rough. The largest tree I have measured was 6 feet in girth and about 40 high; another had a bough-spread of 17 yards diameter; but such dimensions are unusual, commonly the tree is small. Brandis says that the stem is often buttressed; this I have never seen nor should I describe the tree as 'tall' as he does.

On p. 26, line 11 from bottom, *for* "There is no mistaking it; the whorls" *read* "There is no mistaking it when, as is usual, the whorls"

The **leaves** are very large, on thick velvety stalks an inch or so long. I have seen a leaf 15 by 8½ inches and leaves 10 by 6 inches are not uncommon. The upper surface is slightly glossy; underneath the midrib and veins bear a fine, yellow down. In shape it is obovate. Red leaves are often seen as the leaf turns so before falling.

The **flower** is very small, growing in slender, axillary spikes which bear male flowers at the top and bisexual ones below. There are no petals. The 5-toothed calyx is green externally and white internally.

The **fruit** is a drupe about 2½ by 1½ inches; ellipsoidal in shape but flattened and pointed, with a narrow ridge all round the longer circumference. The pericarp is thick; the stone resembles an almond and the kernel is eaten.

TERMINALIA CHEBULA (*Combretaceæ*)
Tamil, Kaḍukkây—*Telugu*, Karakam
English, Myrabolan.

Not often seen in the cultivated parts; essentially a tree of the hills within the deciduous zone.

A dark-barked tree of small to moderate size.

The **leaves** are opposite or sub-opposite, on rather slender petioles under an inch in length; elliptic-lanceolate with a blunt point or slightly obovate with a round end; stiff when old and glossy but bearing shiny white hairs when young; veins

yellowish; up to about 6 by 3 inches in size. The petiole bears two glands or swellings near the upper end.

The **flowers** are very small and grow in spikes which may be 4 or 5 inches long. The 5-toothed calyx-tube is yellow and about one-sixth of an inch across. There are no petals. The 10 yellow stamens are comparatively long and have good-sized anthers.

The **fruit** is often seen as it is much used in tanning. It runs to about 2 inches long by about 1 inch across and may be obovoid, ovoid or pointed at both ends. It bears distinct longitudinal ridges but is otherwise smooth; in section 5-angled; in colour green or greenish-brown. Note the marked difference between the fruits of *chebula* and *belerica* which readily distinguishes the two trees.

ANOGEISSUS ACUMINATA (*Combretaceæ*)

Tamil, Namma—*Telugu*, Pâchi, Pâsi.

Often a fine, tall tree. I have measured it 9 feet in girth. It has a pretty, airy look with its small leaves and slender, drooping branchlets. The bark is either smooth and dark gray or cracked and almost black. The underbark is reddish.

The **leaves** are sub-opposite, on short, slender petioles. The blade runs to about $2\frac{1}{2}$ inches by about half as broad. They are lanceolate or elliptic or something between the two. There is a little down on the young shoots and the undersides of the leaves.

The **flowers** grow in numerous, little, round, short-stalked heads, each head bearing many minute flowers, a quarter of an inch or so long. There are no petals. The slender, green calyx-tube expands into a sort of membranous, 5-toothed cup. The 10 slender, yellowish, spreading stamens are set in a double series and, as they project considerably beyond the calyx, they give the flower-heads a yellow and rather spiky look. The flower is slightly fragrant.

The **fruits** are agglomerated into small, spiky balls. Individually they are flat, scale-like bodies, green to brown in colour, and bear on either side a wing and at one end a long, slender beak which consists of the stiffened, persistent calyx-tube. The fruit is one-sixth to one-fifth of an inch broad and about one-third of an inch long and contains a single seed.

EUGENIA JAMBOLANA (*Myrtaceæ*)

Tamil, Navvâ, Nâvval, Nâgai

Telugu, Nêrêḍu, Jamba.

A fine, tall, big tree, particularly common in avenues. It can generally be recognized by its light-coloured bark, its drooping appearance and the slightly aromatic smell of the bruised **leaves** which are opposite, glossy, dark-green and very delicately veined. If they are held up against the light, it will be noticed that they have a continuous, transparent edging. They are elliptic but taper towards both ends and run to about 6 by 2 inches.

The **flowers** grow in cymes which stand out stiffly along the twigs and run to about 3 inches in length. Brandis describes the cyme as trichotomous but this must be a mere slip. The branches of the cyme (often numbering 8) are in opposite, and generally decussate, pairs; they jut out stiffly from the common peduncle and the sub-branches are similarly arranged. The sub-branches are themselves branched and finally one comes to the flowers themselves which grow sessile and in threes. The calyx-tube has 4 slightly marked teeth and is somewhere about one-sixth of an inch long; in colour it becomes yellowish within and yellowish-pink, crimson or lilac outside. Over the calyx-tube the united petals form a sort of cap till forced off by the numerous, little, white-headed stamens which give the flowers a general appearance of whiteness. This cap or calyptra is green, whitish or tinged with lilac. The stamens are a quarter of an inch or so long, grow in a close fringe round the edge of the calyx, are widespreading and, though slender, are somewhat stiff and give the opened flower a spiky look.

The **fruit** turns when ripe to a very dark crimson, almost black. It then closely resembles a black cherry. It is edible, raw or cooked, and is slightly acid with a taste suggestive of the smell of sandalwood. This taste becomes rather too marked when the fruit is stewed. The books describe the fruit as a berry, but, as it has a single, large seed, one might take it for a drupe, the *testa* of the seed

being shelly. There is another rather similar tree called Allanêrêḍu in Telugu, which is treated as a mere variety of *E. jambolana* and which is principally distinguished from it by the size and shape of its fruit. This is an oblong or slightly-kidney-shaped body about 1½ inches long by 1 inch in diameter. At the top is a hole and in the young fruit it is apparent that this represents the cavity of the calyx-tube, the remains of which appear as a conspicuous, circular outgrowth. The flesh is juicy and thick and is eaten, but it has a disagreeable taste.

BARRINGTONIA ACUTANGULA (*Myrtaceæ* group *Lecythidaceæ*)

Tamil, Kaḍapa—*Telugu*, Kaṇapa, Kaṇigi.

A moderate-sized tree with a brown, rugged bark.

The **leaves** which run to about 7 or 8 by 2 or 3 inches are variable in shape. Sometimes they are conspicuously obovate, the apex being occasionally so suddenly rounded off that the leaf is almost square-ended; often, however, they tend to an elliptic-lanceolate or oblong-lanceolate form. The edge is lightly serrated. The petiole is about half an inch long and slightly downy.

The **flowers** grow in lax, terminal or axillary, downy racemes which run to 18 inches long and are often in groups. The flowers are small and numerous. The calyx is green, small, with 4 lobes. The corolla is whitish-green with 4 small petals

curling over. The stamens are thread-like, pink or scarlet, numerous and about half an inch long and grow round the edge of a low, white ring which is formed of the cohering bases of the filaments. The style is pink and slender. The general effect is that the flower is scarlet.

The **fruit** (an inch or more long) is a drupe containing one large seed. It is oblong in shape, making in section an almost perfect square, though the points of the square are slightly rounded.

PSIDIUM GUAYAVA (or *guava* or *pomiferum* and *pyriferum*) (*Myrtaceæ*)

Tamil, Gôva, Gôya—*Telugu*, Gôya, Jâma, Jani (?)
English, Guava.

(Foreign)

A very small tree or big shrub, common in gardens. The trunk and boughs have a peculiar smooth, greenish or yellowish-brown or faintly-purple gloss. The skin peels off in rolls. The young shoots bear four small narrow ridges giving them a square shape.

The **leaves** are numerous, opposite, decussate, conspicuously veined on the under surface, on short petioles, oblong, up to about 5 inches in length; the margins slightly wavy; the colour dull-green. The alternate pairs are set on in the same plane and all are set on *almost* in the same plane. When bruised the leaves smell somewhat like boiled turnips.

The **flower** which is pretty and fragrant is generally about 1½ inches in spread. The calyx breaks away

into a varying number of very irregular segments. The petals are pure white; they vary in number, probably on account of assimilation to the 'double' form, but the standard number seems to be 5; they may be 1 inch long and half as broad. There is a crowd of long, soft, slender, white stamens which are half an inch or so long; the anthers assume a lilac or brown tinge. The pistil is longer than the stamens, and has a white style and a small, green stigma.

The **fruit** is a large berry crowned with the calyx segments and containing numerous small seeds. It hardly calls for description as it is so well known.

CAREYA ARBOREA (*Myrtaceæ*—group *Lecythidaceæ*—or *Barringtoniaceæ*)

Tamil, Tânri, Pûtatammi, Ayama, Kambili, Pûla
Telugu, Dudippi, Kumbhi, Gâdava, Gâdha.

A large tree, not common, with rough brown bark. The foliage is distinctly like that of *Terminalia catappa* in general appearance but the two trees are easily distinguished because the leaves of *careya* are slightly crenate and its branches are not whorled.

The **leaves** are alternate on short and very thick petioles, growing all round the whitish branchlets; they are light-green, rather stiff, very large (up to, say, 12 by 8 inches), very slightly acuminate and obovate; on the under surface the white veins are strongly marked. The blade extends down the sides of the petioles to, or nearly to, the base so that it is not easy to say where the stalk ends and the blade begins.

The **flowers** are conspicuous and curious. There is a green calyx-tube with 4 large overlapping lobes; it is about an inch long. The 4 petals are 2 inches or more long; in shape they may be described as oblong but narrowing towards the end; they are often twisted; in colour they are greenish. The thread-like stamens are very numerous and a couple of inches or so long; the outer ones are partially scarlet, the inner are yellowish-white; some of them have no anthers; their united bases form a ring which is readily detached from the rest of the flower (the petals, too, drop off readily). The ground under the tree is often covered with the rings of fallen stamens. The style is long and greenish. There are 3 green bracts below the calyx. The flower has a faint and peculiar scent; to me it seems to recall the smell of the sea.

The **fruit** is crowned with the calyx and long style when young. It is a berry, spherical, 10 or 11 inches in circumference, with a hard rind and rather fibrous flesh. It gets a yellowish tinge when ripe and generally contains a number of brown seeds.

COUROUPITA GUIANENSIS (*Myrtaceæ*—group *Lecythidaceæ*)

Tamil, Nâgalingam—*English*, Cannonball tree.

(Foreign)

This is a rare tree but so remarkable as to well deserve mention.

The specimens I have seen ran to about 6 feet in girth and 50 feet or so in height. The trunk is smooth but lumpy, grayish-brown, brown or dark-brown in colour. The pole is straight ; the branches short and horizontal, tending to be whorled. The trunk is covered from near the foot to a good height by the flower-stalks. These start short and green, covered with flowers ; but, continually growing, they end as stout, twisted, withered-looking, hanging stalks which may be as much as 6 feet long and bear flowers only on the tips.

The **leaves** grow in circular clusters at the ends of the branchlets. The petiole is an inch or so long and somewhat hairy. The blade is oblanceolate or narrowly obovate, growing to about $10\frac{1}{2}$ by $3\frac{1}{2}$ inches ; it is generally slightly pointed. The veins are numerous, well-marked and often outlined in darker green.

The **flower** is beautiful and so fancifully designed as to suggest a conscious effort to make something strange. The inflorescence is a raceme bearing numerous flowers, at the base of each of the pedicels of which is a narrow, straight, hollowed bract nearly half-an-inch long. The pedicel is an inch or so in length and bears 2 small bracts near the apex.

The bud is circular, depressed, nearly $1\frac{1}{2}$ inches in diameter and tightly covered by the overlapping petals.

The green calyx-tube has 6 small lobes which are closely attached to the petals. The ovary bears at

the top a 6-rayed, sessile stigma and it is ringed round by a large, flat, circular plate covered with a dense growth of short, yellowish-white staminodes. At one side the plate, which appears to be formed of cohering filaments, is prolonged into a great. broad tongue which curves round to form a hood over the ovary and plate. This tongue which is pink or magenta in colour throws out at the end and underneath a crowd of pink stamens with yellow anthers. The fancy of the Tamil people has, not unsuitably, found in the tongue and ovary the many-headed cobra brooding over the lingam-stone.

The 6 petals are somewhat concave and rather fleshy. Underneath they are yellowish-white and shiny, above pale crimson. They have a spread of about $4\frac{1}{2}$ inches.

The flower has a very sweet, carnation-like smell.

The **fruit** is a large ball, earthy-brown in colour, covered with small papillæ and bearing distinct traces of the calyx-lobes. The largest specimen I have seen was 14 inches in circumference but I believe it grows much bigger. The outer shell of the berry is thick and hard. The interior, in one specimen opened, was filled with a hardish, green substance in which were embedded a few, small, brown seeds. "The Treasury of Botany" by Lindley and Moore (a very useful old book) states that the pulp of this fruit is of an agreeable flavour; such was not my experience, the poisonous-looking stuff burnt the mouth like pepper.

MEMECYLON EDULE (or *tinctorium*)

(*Melastomaceæ*)

Tamil, Kâsân—*Telugu*, Alli.

A shrub commonly or a very small tree with brown bark and drooping boughs. There are several species which may easily be confused. *Edule* is probably the commonest. It is found frequently in some places, mostly in scrub jungle, and is so conspicuous by the colour and growth of its flowers that it attracts attention at once.

The **leaves** are opposite and decussate, on short petioles, elliptic or oblong but tapering somewhat at both ends, up to about 3 inches in length, below dull green, above rather glossy; the veins are indistinguishable.

The **flowers**, which are very small, grow in abundance out of the *boughs* in corymbose clusters on short stalks. The calyx-tube is (often at all events) pink; the 4 petals are of a beautiful bright blue. The stamens, the large anthers and the long style are also blue. The tree, when in bloom, looks from a little distance as if the branches were covered with a blue mildew.

The **fruit** is a small, round berry about the size of a pea, turning from green, through red, to a blackish purple; bearing at the top the remains of the 4-toothed calyx-tube and containing one or two seeds. It is edible but a tasteless thing.

Talking of blue mildew on boughs somehow recalls a story I heard from a Forest Officer. He was

after bison on the ghats above Canara and got benighted. As he was groping through the jungle he came suddenly on a valley which seemed to be filled with flickering, blue fire and looking closer found that all the branches of the trees and shrubs there were outlined with a phosphorescent glow. He tried to find this enchanted valley again by daylight but was naturally unsuccessful.

LAGERSTRŒMIA FLOS REGINÆ (*Lythraceæ*)

Tamil, Pûmaradu, Kadali, Koḍalaimukki, Malaiaḷavanam—*Telugu*, Varagôgu, Chennangi.

A forest tree which is seen pretty often in gardens where it is grown on account of its showy flowers.

It is said to grow to large dimensions but I have seen it only as a tree of small to moderate size. The bark is smooth and grayish or very light brown as seen by me, but Gamble describes it thus—"Bark smooth, gray to cream-coloured, peeling off in irregular flakes."

The **leaves** are opposite or nearly so, dull and smooth; growing almost in the same plane on very short petioles; oblong or elliptic; tapering slightly or somewhat acuminate; running to 9 by 4 inches or thereabouts. The slightly sunk veins give the upper surface a somewhat ribbed look.

The **flowers** grow in stiff, terminal panicles a foot or so long. They have a general likeness to the hollyhock. The calyx is persistent and has 6 lobes it bears 12 well-marked ridges. The petals have a

spread of about 3 inches; they are pale-purple or dark-mauve in colour, 6 in number, crinkly, clawed. The stamens are numerous with white or reddish filaments and brown and yellow anthers. The style is long and much the same colour as the petals.

The **fruit** is a capsule which bears a sharp spike at the end and is ellipsoidal or almost spherical in form and an inch or less in length. It goes brown or blackish and splits into 3 to 6 valves. The seeds are numerous, small, brown, with a broad wing, including which the seed is half an inchor so in length.

PUNICA GRANATUM (*Lythraceæ* or *Myrtaceæ*)

Tamil, Mâdalam—*Telugu*, Danimma, Dâḍima, Dâḷimba—*English*, Pomegranate.

A shrub or small tree, common in gardens, never seen wild to my knowledge and doubtless a foreigner though long naturalized. It is easily recognised when in flower or fruit. The branchlets are often spinescent, that is, have sharp points.

Brandis' description of the **leaves** is complete as to shape—"oblong-lanceolate or oblanceolate, obtuse, 1—3 inches long, narrowed into a slender petiole." They are opposite, almost decussate, dark-green.

The **flower** has a great, scarlet calyx cleft, usually, into 6 teeth between which are the large, disconnected, soft, scarlet petals. The yellow-headed stamens are very numerous. Often the flower is "double." The large, hard-shelled, globular **berry** with its

red, transparent pulp covering the numerous seeds is too well-known to need detailed description.

CARICA PAPAYA (*Passifloraceæ*, or *Papayaceæ*, or *Caricaceæ*, or *Cucurbitaceæ*)

Tamil, Pappây, Pappi, Pappili—*Telugu*, Boppam, Boppayi, Madana ânapa—*English*, Poppoy.

(Foreign)

A small slender tree with a smooth trunk scarred with old leaf-marks. It is like a small palm as the leaves form a crown and there are generally no branches.

The **leaves** are on hollow stalks a yard or so long and may be a couple of feet in length and breadth. They are palmatipartite and deeply cleft at the base so that the stalk appears to be set on about the middle of the leaf. Large veins or nerves support the great fingers or lobes of which there may be eleven. Each finger is itself pinnatifid and the lobes so formed are occasionally, in their turn, deeply serrated; so that the leaf has a remarkably complicated design.

The tree is generally diœcious, that is, it bears male **flowers** on one specimen and female on another. The flowers have the peculiar fragrant smell of the ripe fruit. The male blossoms are in long, drooping panicles. The calyx is a very small, toothed, green cup. The corolla-tube is about an inch long and divides into 5 narrow lobes (often revolute) about half an inch long; it is yellowish-white. The 10

yellow stamens are in the mouth of the tube. The female flowers grow, few in number, in very short racemes. They have a very small, green, star-shaped calyx and 5 long, creamy-white, narrow petals which are erect but have the tips revolute and twisted. These petals have a spread, when outstretched, of 4 or 5 inches. The ovary is creamy-white and tipped by 5 large, spreading, yellowish, fimbriated (fringed) styles.

The great **berries** are too well-known to need description. They are generally grouped in masses at the top of the tree but sometimes will be seen hanging on long stalks, indicating that female flowers are occasionally found on the panicles of the male trees.

ALANGIUM LAMARCKII (or *hexapetalum* or *decapetalum*) (*Cornaceæ* or *Alangiaceæ*)

Tamil, Aḷanji—*Telugu*, Ûḍuga, Ankôlamu.

(Pronounce the 'g' in the generic name soft as it is derived from the Tamil.)

As a shrub this is a weed found everywhere. It is also quite common as a tree. I have seen it 6 feet in girth but never very tall.

The bark may be nearly 2 inches thick and is light brown, often cracked lengthwise and more or less rough. In rainy weather it absorbs a lot of water and becomes almost spongy. The branchlets are downy, sometimes zigzag slightly from leaf to leaf and bear numerous little lumps. They are often short and spine-like.

The **leaves** serve to identify the tree though only, perhaps, after a little practice. It is true that Brandis observes that they vary exceedingly in shape, but that has not been my experience. I have always found them to be oblong but tapering towards both ends and markedly towards the tip. A large leaf may be 5 or 6 inches long. The lateral veins form an unusually acute forward angle and the midrib and veins are strongly marked below and more or less downy. The leaves are alternate, smooth, rather dark and close-set on petioles less than half-an-inch long.

The **flowers** which are fragrant grow in little clusters along the branchlets. The buds are green, oblong, up to about an inch long. The calyx-tube is short and toothed. The petals are yellowish- or greenish-white, very narrow, strap-shaped, about three-quarters of an nch long, lax, often curled over and twisted, generally about 8 in number. The stamens are half-an-inch or so long, white with long, white or brownish, linear anthers, and sometimes over 30 in number. The style is over half-an-inch long, white, with a round stigma. Sometimes the flowers make a brave show on the leafless tree. I have seen the top of a tree look like a single, huge, pyramidal inflorescence.

The **fruit** is a drupe, spherical in shape, about three-quarters of an inch in diameter crowned with the remains of the calyx. When ripe it is crimson in colour and contains an opaque, white, jelly-like pulp which is eaten but is a mawkish stuff.

STEPHEGYNE (or *Nauclea*) PARVIFLORA
(*Rubiaceæ*)

Tamil, Butakaḍambai, Nîrkaḍambai, Peykaḍambai—*Telugu*, Beṭṭaganapa, Kambabutaka, Dâḍuga, Pasupu Kaḍimi, Rudrakaḍapa, Rudraganapa, Chottibuttava.

This tree is described by Brandis as common but I do not think that it is so in this Presidency. It is rather remarkable in several ways. It grows to a large size and develops buttresses. The trunk is sometimes curiously irregular in shape, as, for example, roughly triangular in section. The smooth, gray bark has a way of scaling off, leaving concave, greenish-white pits in the trunk. The leaf-bearing branchlets tend to grow in opposite pairs and the branchlets generally are very brittle.

The **leaves** are opposite on slender petioles an inch or two long and have fairly-well-marked veins which run forwards at a sharp angle from the midrib. They may be oblong, or elliptic, or slightly ovate or obovate (Brandis says that they are often nearly orbicular); sometimes they have a short, blunt point. They grow to about 6 inches in length, are lightish-green, shiny above and slightly downy below. In the axils of terminal pairs of leaves there are large leaf-buds which are flat but ridged up the middle, milky and often pinkish in colour.

The **flowers** are fragrant and grow in dense, spiky balls about an inch across. These balls may be solitary or they may be in opposite pairs standing on straight, spreading stalks about 2 inches long.

Between these spreading peduncles there is often a third flower-head which is sessile or almost so. At the bases of the flower-heads are a pair of long, stalked, oblong lanceolate leaves which are described by Brandis as "foliaceous bracts."

The flowers have a very small calyx and a slender corolla-tube which is pink at the base, white above and opens into 5 green lobes on which stand the anthers. There is a long, projecting style with a white, club-shaped stigma. As the flower grows older the corolla goes brownish and the stigma yellowish.

The **fruit** consists of minute, brown capsules which cover thickly the head on which the flowers grew.

GUETTARDA SPECIOSA (*Rubiaceæ*)

Tamil, Pannîr.

A small tree common in native gardens and back-yards. It is smooth and light-brown in colour with a red under-bark.

The **leaves** crowd in small clusters to the ends of the twigs and it is characteristic of the tree that the branchlets are often twisted and hang down like tendrils.

The leaves are opposite and broadly obovate, sometimes almost rotundate. The petiole is downy and not more than half-an-inch or so long. The blade which is limp generally runs to about 6 by 4 or 5 inches, the under surface being rather harsh

and showing well-marked veins ; the upper surface is somewhat shiny.

The **flowers** grow in small cymes on rather downy peduncles which are 2 or 3 inches in length. In the typical form of these cymes the peduncle ends in a flower below which rise two branches which similarly end and branch. The peduncles grow in opposite pairs from the scars of fallen leaves near the ends of the branchlets and have a pair of stipules between them. The flowers are very sweet, smelling of cloves. The calyx is small and greenish. The corolla-tube is white, an inch or so long, and has a varying number of lobes up to 9. The stamens similarly vary in number and are affixed to the mouth of the tube.

The **fruit** is a drupe, depressed globose in shape, about an inch across, containing a woody stone with irregular, rounded angles.

Ixora parviflora (*Rubiaceæ*)

Tamil, Sulandu, Korivi, Navugu, Korân Kaṭṭai.
Telugu, Korivi, Koripal—*English*, Torch tree.

The inflammability of the green branches which are used as torches accounts for the English and other names.

A small tree not common out of the forests but occasionally seen elsewhere and pretty frequent in Madras. It has smooth, often tubercled, light-brown bark and the boughs sometimes droop to the ground.

The most conspicuous thing about the **foliage** is

the pointed stipules between each pair of leaf-stalks. These may be roughly triangular or long and awl-shaped. The leaves are opposite and generally on very short petioles, more or less shiny (occasionally much so); sometimes dark in colour; oblong or elliptic or very slightly obovate, somewhat rounded at the base, sometimes ending in a short, blunt point; up to about 5 or 6 inches in length by $2\frac{1}{2}$ inches or less in breadth.

The **flowers** grow in cymes forming a sort of terminal panicle up to about 5 inches in length. From the axis of the inflorescence branch pairs, or double pairs, of stalks which again branch into small clusters of flowers. There is a small green calyx and a very slender corolla-tube about one-third of an inch long. The corolla is white and has 4 narrow, oblong lobes. The 4 yellow-headed stamens alternate with the corolla-lobes. The style projects and has a swollen, greenish head. The spread of the flower is only about a quarter of an inch. It is slightly scented.

The **fruit** is classed as a drupe. It is shiny, globular, the size of a small pea, turns through red to black and contains two seeds.

There is another species of this plant which is common in Madras gardens but does not seem to grow to anything more than a large shrub. It has pairs of large leaves running to about 9 inches by 3. They are oblong but taper gradually towards the short petiole. The inflorescence is distinguishable from that of *I. parviflora* in that it has not a panicled form

but consists of clusters of 3 flowers which rise to the same level and unite to form one large and pretty umbel. The flowers themselves are like those of *I. parviflora*, but they can be distinguished at once by their much greater size, the corolla-tube running to about 1½ inches in length and the lobes having a spread of half-an-inch or more; also the style is forked. I have heard this plant called *I. polyantha* and *I. alba*, but the former name may be questioned as the inflorescence is not woolly.

MORINDA CITRIFOLIA (*Rubiaceæ*)

Tamil, Manjanatti, Nonâ—*Telugu*, Mûlaga, togaru.

One of the commonest of trees—of small to moderate size (I have seen it over 7 feet in girth) with a very rough, cracked and deeply furrowed, brown bark. The branchlets are roughly squared.

The **leaves** are somewhat shiny; grow on short stalks and are elliptic or oblong but tapering at both ends—to a tail at the free end. They generally grow in pairs but sometimes in whorls of three. The blade runs to about 8 inches long by nearly 3 inches broad and its margin is a bit wavy.

The **flowers** grow sessile out of a green receptacle. They are small with 4 or 5 narrow, down-curving, white, corolla-lobes. The stamens bear curiously shaped, dark anthers and the style is forked.

The **fruit** grows on a stalk an inch or so long. It is pale green, shiny, roughly globular, an inch

or so in diameter, and divided by dark green lines into irregular compartments each tipped by a little light-coloured nipple or scar which marks the position of the calyx. Each compartment consists of a fruit—a drupe containing a hard stone. The fruit is thus a composite one consisting of a group of cohering drupes.

Morinda tinctoria (*Rubiaceæ*)

Tamil, Sâga, Nonâ—*Telugu*, Maḍḍi.

As seen by me a small tree with rough, light-brown bark and drooping twigs. It is quite common in some places and can be readily distinguished by the peculiar shape of the **leaves**. These are generally slightly narrowed about the middle of the blade, shortly acuminate or bluntly pointed, either oblong and tapering towards both ends, both sides being almost flat, or, else, very narrow and oblanceolate or almost linear. The blade runs to 6 inches or more and the width of a leaf of that size varies from less than an inch to $1\frac{1}{2}$ inches. The leaves are smooth, set on in pairs at varying angles and have very short stalks.

The **flowers** grow in small heads on a roughly-globular receptacle. There is a very small, circular, green calyx. The corolla-tube is about three-quarters of an inch long with 5 or 6 lobes. These lobes are about half-an-inch long, pointed, greenish (like the tube) outside and white inside. There are 5 or 6 stamens with large, yellow anthers reaching a little

beyond the mouth of the tube. The pistil is shorter and has two large stigmatic lobes at the apex.

The **fruit** is a flattened, very irregular conglomeration of drupes, greenish in colour, an inch or so across.

Mimusops elenghi (*Sapotaceæ*)

Tamil, Mogaḍa, Magila—*Telugu*, Pogaḍa.

Frequent in gardens in Madras and not uncommon elsewhere. Generally characterized by a short, dark and very rough trunk and wide-spreading, often drooping, boughs. The largest I have measured wss over 9 feet in girth and 40 or 50 feet high. The small shoots are downy.

The **leaves** sometimes resemble those of *Ficus Benjamina*, even occasionally to the extent of having an oblique point. They are generally very glossy and are dark-green when old, closely but faintly veined, elliptic or oblong, short or long acuminate, wavy-margined, alternate, on petioles an inch or less in length. In size they vary greatly, running to 7 by 3 inches but being generally much smaller.

The **flowers** by the stiffness of their parts remind one of small "everlastings." They grow usually in groups of 3 or 4 in the axils of the leaves on stalks half-an-inch or so long and measure one-half to three-quarters of an inch in length. There are 8 stiff, pointed calyx-segments whereof 4 are brownish and alternate with 4 white ones with brownish tips. Then comes a short corolla-tube split into 24 pointed

segments, of which 16 are brown-tipped and form a fringe round the rest which are white and constitute a sort of cone within which are the 8 brown stamens. The flowers are scented and long retain their fragrance.

The **fruit** is a small berry, in shape usually a narrow ellipsoid, sometimes ridged and often bearing at the apex a short bristle, the other end being attached to the persistent calyx. It goes yellow when ripe and contains 1 to 4 hard-shelled seeds.

BASSIA LONGIFOLIA (*Sapotaceæ*)

Tamil, Iluppai—*Telugu*, Ippa, Ippi.

This common tree (often grown in topes) may easily be confused with the mango when in leaf only.

The bark is described by Gamble as "dark yellowish-gray." I should rather describe it as grayish-brown or brown. It is often deeply furrowed longitudinally and cracked across. The bole is commonly short but the tree is often a fine, big one and I have measured it 13 feet in girth. It is sometimes buttressed.

The **leaves** are elliptic-lanceolate and closely resemble those of the mango. The most conspicuous difference is the sort of tufted look of the foliage of *Bassia* due to the crowding of the leaves to the ends of the branchlets. The mango leaf is also larger, generally lighter in color, much more tapering and has veins which take off more nearly at right angles to the midrib than is the case with *Bassia*.

The **flowers** grow in clusters of 20 or so on slender,

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stalks 2 or 3 inches long. The 2 outer calyx-lobes are green and have a spread of an inch or more. The 2 inner lobes are greenish-brown and velvety. The corolla-tube forms a fleshy, yellow ring fringed with 8 erect, narrow, greenish-white lobes. Within the corolla-tube are 16 stamens with large, brown anthers. The corolla is about half-an-inch long. The style is green and about $1\frac{1}{2}$ inches long.

The **fruit** is a green berry, about 2 inches long in large specimens. It varies in shape from a sort of quarter-moon ('obliquely-ovoid' says Brandis) to a nearly spherical form. The seeds are shiny, brown and long. They vary in number. In the quarter-moon berry there is commonly only one, in the rounded form 2, 3, 4 or even 5. The fruit is full of a very sticky, milky juice which attracts crowds of large, red ants which bite furiously. Bears also are said to have a great liking for the fruit.

DIOSPYROS MONTANA (*Ebenaceæ*)

Tamil, Vekkana—*Telugu*, Muchchi ṭanki, goddi-gâta, Pudumaddi, Mulla tummikâ (?), Jagulaganti—*English*, Tree of Strife.

Gamble says of this tree that it is "nowhere very abundant and yet very widely spread." He also refers to a superstition which would account for the English name which I heard at the Government Farm at Coimbatore. He further describes the tree as "small or moderate sized, often spinous;" Brandis as "a large shrub or small tree, branches sometimes spinescent." I am forced to describe it

from a single specimen as I have not had a recent opportunity to examine more. This was a small but stout tree, in height 20 feet or so, with a short, ridged, irregular, gray trunk some 7 or 8 feet round; the branches are very stout and with a good spread.

The **leaves** are alternate, oblong-lanceolate, on short petioles, smooth (the young leaves are said to be downy), with a blade running to about 3½ by 1½ inches.

The **flowers** are male and female: the latter grow solitary, the former in little cymes on short stalks. The flower is between one-fourth and one-third of an inch long. The calyx-tube and corolla-tube are four-lobed; the former is green, the latter more green than white, turning purplish when withering. The 16 stamens of the male grow in 8 pairs. There are 4 styles.

When in **fruit** the tree is easily recognized by the numerous, close-growing berries. These are yellow or orange when ripe, depressed globose, about three-quarters of an inch in diameter, soft, smooth and shiny. At one end is a little, hard point; at the other the green, leaf-like, 4-lobed calyx. Inside it is sticky and there are numerous brown seeds. It is said that nothing will eat the fruit.

DIOSPYROS SAPOTA (*Ebenaceæ*)

Tamil, Sîma iluppai, paṭṭu iluppai

English, Date plum

(Foreign)

Occasionally seen in gardens in Madras as a tree

of, say, 4 feet in girth and 40 feet in height. It is rather compressed in appearance, the branches being short. The bark is dark and rather rough and the shoots bear a soft, brownish down. A rather handsome tree.

The **leaves** are abundant and alternate in the same plane. The young ones are smooth, light-green with a pinkish tinge; the older ones are of a rather dark green but lighter below. The petiole is under an inch and rather downy. The blade is a long ellipse with a slight point, rather stiff and running to about 8 by nearly 3 inches. The veining is indistinct.

The **flowers** which are very fragrant grow close together on very short stalks. They are thick and stumpy and attain a length of about three-quarters of an inch which is little more than the length of the calyx. The calyx is green and has 4 or 5 rather fleshy and slightly overlapping sepals. On the young calyx and ovary there is a white, silky down. The corolla-tube is the same length as the calyx and throws over the edge of it 4 or 5 down-curving, white lobes. There are 4 or 5 stamens adherent to, and concealed within, the corolla tube. The styles are short and 4 or 5 in number. Generally all the parts are either 4 or else 5, but I have found 5 sepals in combination with 4 corolla-lobes, 4 stamens and 4 styles. There is a good-sized bract below the flower. All the flowers I have examined appeared to be bisexual.

The **fruit** is a big berry to which is attached the

persistent calyx. It is globular or slightly pointed and may be as much as 9 inches round. It is covered with a russet, velvety down and contains, as counted by me, 2 to 7 seeds which have a brown shell. The flesh is thick and the fruit is said to be edible.

Cerbera odollam (*pocynaceæ*)

Tamil, Kudiraipuḍukku, Aṭṭarali

A small tree common in Madras, especially on the banks of the Buckingham Canal. I do not remember seeing it elsewhere, but it is said to be common by water in Travancore. It is rather low-growing with a smooth, brown or greenish-brown, fairly stout trunk. The branches are sometimes very knobby and the branchlets, which are soft and milky, are marked with scars of fallen leaves.

The glossy **leaves** crowd round the ends of the branchlets and can be distinguished at once by their shape. The blade, which may be 10 by $2\frac{1}{4}$ inches, gradually widens and rounds off abruptly into a short acumen or blunt point. It is thus narrowly obovate or oblanceolate. The petiole is up to 2 inches long.

The **flowers** are in terminal, branching, cymose clusters, the stalks of which are barred with black lines. There are large, whitish-green, caducous (non-persistent) bracts. The flowers are strongly scented. The calyx-lobes are green, narrow, down-curving. The corolla-tube is greenish, about three-quarters of an inch long. The corolla lobes, which

have a spread of 2 inches or so, are pure white and are curiously squared, notched or angular at the free ends. The corolla-tube is yellow inside.

The shape of the **fruit** is aptly described by the first Tamil name given above. It is smooth, shiny, light green freckled with white; a drupe, flattened on one side and so almost hemispherical. A slight furrow runs round the fruit. It may be 9 or 10 inches round and is slightly compressible and very light. The one large seed is surrounded by a tough, fibrous endocarp.

PLUMERIA ACUTIFOLIA (or *acuminata*) (*Apocynaceæ*)

Tamil, Kapparali, navillu—*Telugu*, Dêvaganniru
English, Pagoda tree or Frangipani

(Foreign)

Said to be of American origin but long naturalized here and very common. I presume that the English name has reference to a supposed abundance near temples. A small tree which is very easily recognized. The trunk is dark-green breaking into a brown bark in places. The boughs are smooth, dark-green, fleshy, flexible but easily broken, milky, ending abruptly in crowns of fine **leaves**. These have a stalk up to about 2 inches long and a blade which may be a foot or more long with a width of one-third that size or less and which is pointed at both ends. The veins are regular and well-marked. The outside enclosing vein (the intramarginal vein) is distinct

and leaves a free border. The leaf is sometimes slightly obovate.

It **flowers** most freely before the foliage comes and the blossoms are beautiful. The calyx is very small. The corolla consists of 5 petals; these are white but they are touched outside with pink and splashed inside with gold. They have a spread of 2 or 3 inches.

The flower is extremely fragrant, with the typical cloying scent of the tropical flower.

The **fruit** I have not seen. The tree is said to produce seed only rarely in India.

Plumeria alba (*Apocynaceæ*)

(Foreign)

This is much rarer than *P. acutifolia* from which it is easily distinguished by its leaves. It is a bigger (though still small) tree and often forms a fine, rounded mass of foliage and flowers.

Generally the **leaf** runs to about 5 inches by 2 but occasionally it is double that size. The petiole is an inch or two long. The leaf is obovate or oblong with a bluntly-rounded, almost square, apex; very dark, stiff, glossy, slightly emarginate. There is underneath an extraordinarily developed system of high, white, parallel veins, almost at right angles to the midrib; the intramarginal vein is also well developed. The midrib is very thick and the margin of the leaf is folded over towards the under side. The large, white **flowers** grow in masses, are heavily

scented and resemble those of *P. acutifolia*, but they are half an inch or so larger in length and spread and have no pink and much less gold about them and the petals overlap less and are much narrower.

The **fruit** is peculiar, consisting of a pair of long, cylindrical, pointed, dark-green or blackish follicles which are joined at the base and spread out pretty widely; they run to 8 or 9 inches long by 2 inches or so round; on the surface are scattered, brownish lumps.

THEVETIA NERIIFOLIA (*Apocynaceæ*)

Tamil, Tangarali, Ponarali
English, Exile oleander
(Foreign)

This is one of two shrubs or very small trees bearing conspicuous yellow flowers which are very common in gardens. The one is *Tecoma stans* and the other *Thevetia neriifolia*, the latter being readily distinguished by its long, grass-blade-like leaves.

Thevetia has a smooth, greenish, scarred bark, The **leaves** are linear, up to about 5 inches long, alternate, growing close-set all round the twigs. They are sessile or almost so and have a well-marked midrib but no other noticeable veins.

The **flowers** have a small, green calyx with spreading, lanceolate sepals. The tubular corolla opens into 5 bright-yellow, flat-ended lobes which are over

an inch long. Each of these lobes has on one side, on the exterior, a prolongation, as it were, of the greenish tube. The corolla-lobes overlap each other. The 5 stamens are very short and attached to the tube. The style is short and bears a large circular anther.

The **fruit** is a drupe with thick flesh; smooth, milky and green when young, dark brown when ripe. It may be 2 inches long by 1½ broad. The most striking pecularity is a high, notched transverse ridge across the middle of the upper surface (sometimes there are three transverse ridges, two being small). It is flattened on the side bearing the ridge and notched at both ends; viewed from above the outline is roughly elliptic or almost circular. There is a large stone which is two-celled and each of these cells is again divided into two. There may be 4 or fewer seeds.

Wrightia tinctoria (*Apocynaceæ*)

Tamil, Veppâlai

Telugu, Teḍlapâla, Pâlavireni, Marâle

Usually a small tree, though I have seen it 4 feet in girth and 40 or 50 feet high, with light-brown, or gray, rough bark. When in flower the tree is often a mass of white bloom.

The **foliage** is of a pretty, bright green when young, dull and rather dark later; the veins (sunken on the upper surface) are conspicuous and often marked out in darker green. The leaves are

opposite, set on at various angles and running to 5 by nearly 2 inches; elliptic or oblong; acuminate.

The **flowers** grow in terminal clusters of small, branching cymes. They are fragrant, white, an inch or more across, with a small toothed calyx-tube and 5 narrow corolla-lobes spreading starwise. In the middle is a scaly cone. Along each of the corolla-lobes lies a bundle of 5 white threads and alternating with the lobes are 5 bundles of shorter white threads. These threads resemble stamens but are, I understand, mere outgrowths of the petals. The real stamens are 5 in number and about a quarter of an inch long and form the scaly cone which contains and conceals the pistil.

The distinguishing feature of the tree is the curious **fruit**. This consists of two very slender, cylindrical follicles, a foot or more long; dark green in colour; bearing little whitish protuberances; joined at the tips so as to form a sort of narrow horse-collar. The tufted seeds lie in a casing of silvery silk.

The follicles, and the tree generally, are milky.

STRYCHNOS NUX-VOMICA (*Loganiaceæ*)

Tamil, Eṭṭi—*Telugu*, Mushṭi, Musiḍi
English, Strychnine

Common in some places. Bark very thin, very light brown or gray, smooth; under-bark green. Usually a rather small tree but I have seen it nearly 9 feet in girth and 40 feet or so high.

It is fairly easily recognized by its three veins

starting from the base of the leaf, the two lateral ones curving inwards towards the point. There are sometimes 5 basal veins but usually the 3-veined arrangement is conspicuous. The leaf-stalks are short, one-third of an inch or so in length. The **leaves** are opposite, set-on at varying angles, smooth and shiny. In shape they are commonly elliptic but pointed towards both ends; sometimes, however, they are slightly ovate or rotundate, even, occasionally, somewhat emarginate. In length they range up to about 5 inches. The leaf-bearing twigs often have only 2 or 3 pairs of leaves and might be mistaken for the petioles of pinnate leaves. These twigs will be found to end in a spine-like point between the terminal pair of leaves.

The **flowers** grow in terminal, compound cymes. The calyx is green, toothed, very small. The corolla-tube is cylindrical, slender, about half-an-inch long, green, opening into 5 small, pointed lobes, yellowish-green in colour. The 5 stamens are to be found at the mouth of the corolla-tube and attached to it. The pistil projects slightly beyond the corolla-tube and is yellow, or dark, at the tip.

When in fruit the tree is easily identified. The **fruit** is a berry, about the size of a lime but apparently (*teste* Brandis) sometimes as large as an orange. It is yellow or orange in colour and conspicuous. The outer covering is hard; the flesh is white and pulpy; the seeds (1 or 2) hard, circular, flattened, with a silvery casing. In Canara the customary custard of camp used sometimes to be

served to me of a bright-green colour and I was told that this was a result of the cows eating this fruit.

STRYCHNOS POTATORUM (*Loganiaceæ*)

Tamil, Têttân—*Telugu* Katakamu, Chilla, Jilla, Induga, Indupu—*English*, Clearing nut.

This tree is not so common as *S. nux-vomica* and can be pretty easily distinguished from it as indicated below. It is of medium size with a dark-brown, rough bark.

The **leaves** have a resemblance as regards veining to those of *S. nux vomica* but they are generally rather smaller, though I have seen them nearly 4 by 2 inches. They are narrower, too, narrow-ovate-lanceolate; slightly acuminate; shiny; opposite. The most noticeable difference between the leaves of the two species is that those of *potatorum* are practically sessile.

The **flowers** grow in very small, cymose clusters at or near the ends of the branchlets. They are about a quarter of an inch long and have a small, green calyx with 5 pointed lobes, a yellowish corolla-tube with 5 pointed lobes bearing, inside, long, white hairs, 5 stamens with large, dark, pointed anthers projecting beyond the tube and a pistil, shorter than the stamens, with a yellowish stigma.

The **fruit** is much smaller than that of *nux vomica*; a round berry about two-thirds of an inch in diameter. It resembles a small, black cherry when ripe, being then of a blackish-purple colour. I have always

found it to contain a single, large seed but from the books it appears that it may have two seeds.

The curious specific name and the English name refer to the use of the seeds to clear water in the manner described in Drury's "Useful Plants."

CORDIA MYXA (*Borainaceæ* or *Cordiaceæ*)

Tamil, Virasu, naruvilli—*Telugu*, Iriki, Nakkera, Pedda iriki, Chilla, Jalagi, Bankiriki.

A common enough tree but not very easily recognized. The following peculiarities may serve to identify it:—

(1) a general resemblance to a pear-tree;

(2) the numerous, drooping twigs, often bare of leaves;

(3) the unusual fact that the free or upper half of the leaf-margin is slightly crenate or serrate, while the other half is entire.

It is a small or medium-sized tree with a light-brown bark which is either smooth or rather stringy-looking with slight cracks or narrow furrows running perpendicularly.

The smaller branches tend to grow out horizontally either straight or bow-shaped.

The **leaf** is variable both in set-on and shape. Commonly the leaves are alternate but sometimes opposite or sub-opposite. They may be rotundate, ovate, obovate or elliptic and are sometimes slightly acuminate. They are smooth and rather shiny above, rather harsh below. There are commonly 3 basal veins and the raised spaces between the veins

give the old leaves a rather beech-like look. The petiole is slender and usually between 1 and 2 inches long. The blade may be as much as 6 inches long but is commonly about 4.

The **flowers** are small and grow in branching cymes which generally run to about 3 inches in length and can hardly be described as either stiff or lax. The calyx is green, obconical, with an irregularly divided rim. There is a short corolla-tube with long lobes which look like ordinary petals. These lobes are curved, sometimes inwards, sometimes outwards and downwards, and are white at first but change colour to a blackish-purple. The flower loses its scent and fades very quickly after gathering. The corolla-lobes seem to vary in number up to 8, but are generally 4 or 5. The stamens are short. The style is remarkable in that it is doubly forked, the prongs being long and twisted.

The **fruit** is an egg-shaped or spherical drupe sitting in the cup of the calyx. It may be three-quarters of an inch or less in length and contains a clear and very sticky stuff round the hard stone. The fruit is eaten but is a tasteless, rather disagreeable, thing. When ripe it is yellowish or reddish.

CORDIA SEBESTENA (*Boraginaceæ* or *Cordiaceæ*)

(Foreign?)

Sometimes seen in gardens where it is noticeable by reason of its rather showy flowers.

A small tree with a light-brown, furrowed trunk.

The **leaves** alternate on thick petioles an inch or

two long. The blade is very harsh, coarse and large, up to 10 by 8 or 10 by 6 inches or thereabouts, ovate-lanceolate; it turns yellow with age.

The **flowers** are in terminal clusters. The calyx brownish-green, tubular, splitting into 2 to 4 teeth, about ¾ inch long. The corolla, a conspicuous reddish-orange, projecting about ⅔ inch beyond the calyx, with 6 to 8 crinkled lobes and with a spread of nearly 2 inches. The 8 stamens reach the mouth of the tube. The pistil is forked.

The **fruit** is shaped like a pear but with the stalk at the thick end. Commonly withered remains of the flowers are to be found at the thin end. In the ripe fruit, which is white or yellowish, the calyx completely surrounds the true fruit with a thick covering which may be an inch-and-a-half or so in length by an inch or so across. When opened this covering has a sweet, pear-like smell. The drupe itself is about an inch long and about two-thirds of an inch broad; the flesh is thin; the stone hard and very thick; there is usually only one seed. one ovary cell only developing.

A tree with a very similar flower is *Cordia tectonifolia*. This has a smaller and softer leaf and a pointed but almost globular fruit about an inch long. Its flower is a paler orange than that of *C. sebestena*.

TECTONA GRANDIS (*Verbenaceæ*)

Tamil, Têkku—*Telugu*, Ṭêku—*English*, Teak

On the East Coast, at all events, the teak is a

disappointing tree, for it rarely attains any considerable size.

It is easily recognized and remembered by its huge leaves which drop in the hot weather with the result that a teak-grove has a curiously wintry look when the temperature is arranging above a hundred. The trunk is light-brown,. straight and long in the bole. The outer bark is thin and, curiously enough, seems to be often eaten off by white-ants. Either because of the ravages of these beasts or because the skin is naturally shed, the trunk often appears barkless and whitish in colour. It is also often marked with shallow, longitudinal furrows. The young, green branchlets are square. Short leaf-bearing twigs are sometimes thrown out from the trunk in a peculiar way.

The **leaves** vary greatly in size. The biggest I have measured was 1 foot 10½ inches long and 1 foot 4 inches broad. They are opposite and decussate, ovate or almost rotundate, slightly pointed and bear a whitish down underneath.

The **flowers** grow in large, conspicuous, terminal clusters of axillary panicles. They are very small, white and fragrant.

The ripe **fruit** (a drupe) is enclosed in the inflated calyx which forms a brown, crinkly, papery, depressed globose cover, an inch or so in diameter. Within, covered with a sort of brown wool, is the small, very hard, 4-celled stone.

Gmelina arborea (*Verbenaceæ*)

Tamil, Marakumalan, Gummaḍi—*Telugu*, Gumuḍuṭêku, Ṭeggummaḍu

A good-sized tree (I have seen it 7 feet in girth and about 50 feet high); not common. The bark is grayish, smooth and tends to break off in large, thick, irregular flakes.

The large, limp **leaves** grow on slender stalks which may exceed 6 inches in length. They vary considerably in relative width (thus a blade may be 8 inches by 7 or $7\frac{1}{2}$ by $4\frac{1}{2}$), but they have the same general character, being (1) ovate-lanceolate, (2) commonly acuminate, (3) semi-cordate. By semi-cordate I mean that the base curves as if to form a deep indentation but the curve is interrupted in the middle by a triangular prolongation of the blade towards the stalk. It is difficult to describe this peculiarity of shape in words. The two lowest lateral veins start below the general level of the base which is commonly very broadly bulging in form. The under-surface of the leaves is hoary and the veins (slightly downy like the petioles) are often yellowish or tawny. The very young leaves look like tawny velvet. The upper surface is sometimes freckled with white, probably as a result of disease. The shoots are squared. Note the shiny, little, green glands or lumps just where the stalk and blade meet; they help to identify the leaf.

The **flowers** are easily recognized by their peculiar shape. They grow in terminal or axillary

panicles with deciduous, narrow, curved bracts below the opposite pairs of pedicels. The calyx is small and green. The corolla-tube which is thick and about half an inch long widens upwards to a gaping mouth surrounded by 5 lobes. Of these, one is much the largest, stands upright, is yellow in colour and has a pentagonal shape. The other lobes are brownish and have a rolled form, two spreading like wings and the others curving downwards (revolute). The total length of the flower is nearly 2 inches.

There are 4 long stamens whereof 2 are shorter than the others and they bend towards the upright corolla-lobe. The style is slightly forked.

The **fruit** (a drupe) is more or less markedly obovoid or else flask-shaped; it is smooth, may be $1\frac{1}{2}$ inches long, goes yellow and contains a juice which leaves a long-lasting yellow stain on the fingers.

PREMNA TOMENTOSA (*Verbenaceæ*)

Tamil, Kollakaṭṭaitêkku, Kistapâlai, Poḍanganâri
Telugu, Nârava, Nagaru, Navaru

Usually a small tree with light-brown, smooth bark. It can sometimes be recognized as a verbena by the somewhat square form of the branchlets and its specifically distinguishing feature is the remarkable downiness from which it derives its name "tomentosa." The boughs, it may be noted, throw out numerous upright branchlets. The branchlets leaves and inflorescence are covered with dense,

greenish-yellow or tawny down. The young **leaves** indeed resemble yellow or tawny velvet and the adult leaves too are soft, flexible and downy on the lower surface and midrib, though in their case the down on the under-surface is white.

The leaves are opposite, decussate, on petioles a couple of inches or so long; they are ovate-lanceolate, sometimes acuminate, run to about 9 by 6 inches and (as is common among the verbenas) are rather fragrant when bruised.

The **flowers** grow in downy, green-stalked, compound cymes some 4 or 5 inches long. They are fragrant, very small, with a green, toothed calyx-tube, 4 white corolla lobes of which one is longer than the rest and 4 white stamens. The style also is white. The branches of the inflorescence grow in opposite, generally decussate, pairs; beneath each pair of these branches there is usually a pair of long, narrow bracts. Brandis refers to the flower as yellow; so far as my observation goes it is always white.

The **fruit** (a drupe) is about the size of a pea and turns a blackish-purple when ripe.

AVICENNIA OFFICINALIS (or *tomentosa*) (*Verbenaceæ*)

Tamil, Mâdâpaṭṭai, Kanna—*Telugu*, Maḍa, Tellamaḍa, Moḍa—*English*, White Mangrove

The English name I get from Drury. It does well enough, though the tree is not one of the true mangroves (*Rhizophoraceæ*) from which it can

generally be distinguished by the fact that it does not throw out the prop-like or stilt-like adventitious roots so characteristic of those trees. It has the peculiarity of throwing up from the roots numbers of little suckers so that the neighbourhood of the tree is generally covered by a dense forest of sprouts looking like a crop of dirty-brown asparagus. These suckers are supposed to give the roots the air which they require. It is a tree of salt swamps and tidal rivers and can be found alongside the Cooum near Government House. Brandis says that the tree grows to great size in the Sunderbunds, but I have seen it only as a small tree up to about 25 feet in height and 5 feet in girth. The bark is smooth (often, however, bearing many small tubercles) and in colour greenish or whitish. The branchlets are brittle and sometimes drooping and the shoots are slightly squared (a regular feature of the verbenas) and slightly downy.

The **foliage** has a general resemblance to that of the holm-oak. The leaves, on petioles half-an-inch or so long, are in opposite, decussate pairs, whitish and somewhat downy underneath, rather shiny above, oblong-lanceolate or elliptic-lanceolate, tapering towards both ends, up to about $4\frac{1}{2}$ by 2 inches, but generally a good deal shorter and narrower, say, commonly, about 3 inches by 1 inch.

The **flowers** are sessile in small heads on stiff peduncles which commonly bear three such heads and grow singly or in pairs out of the axils of the upper leaves, the shoot terminating in a similar

peduncle. The flowers are very small, with a spread of only $\frac{1}{4}$ inch or so. The 5 sepals are green, overlap each other and are held in place by 3 concave, scaly bracts or bracteoles. The corolla is dull yellow in colour and has 4 lobes in the intervals between which are the 4 short stamens growing from the throat of the tube.

The **fruit** I have not seen. Cooke ("Flora of Bombay") describes it as a capsule "1—1½ inches long, ovoid, compressed, beaked, green, wrinkled especially at the base."

Pisonia alba (or *morindæfolia*)

(*Nyctaginaceæ*)

(Foreign)

Tamil, Lanjamuṇḍikîrai, Nachchikkoṭṭai

English, Lettuce tree

Pretty common in gardens, both European and Native. I do not know how it gets its quaint Tamil name of lanjamuṇḍikîrai, but am told that it is because it has "a very good appearance but no flower or any such thing." The leaves are cooked and eaten sometimes. It is a shrub or small tree with light-brown, smooth trunk and soft wood.

The **leaves** are soft and very flexible, growing in decussate, opposite or sub-opposite pairs; ovate-lanceolate or elliptic-lanceolate; blade up to about

12 by 6 inches; petiole about an inch long. The tree is readily known by its foliage, the older leaves being of a very light, bright green while the young leaves are yellowish or nearly white, resembling in colour the 'heart' of a lettuce, which fact, I presume, gave rise to the English name.

I have never seen the **flower** or **fruit** and am told that it never flowers here but is propagated only by cuttings.

COCCOLOBA UVIFERA (*Polygonaceæ*)

English—Sea-side Grape

(Foreign)

A small tree or very big shrub seen here and there in Madras gardens and easily identifiable by the shape of its leaves which are round but broader than long.

The bark is smooth, sometimes falls off leaving depressed patches, and is of a yellowish-gray or grayish-brown colour externally and green underneath. The branches sometimes droop. The young shoots bear a slight, fine, grayish down.

The **leaves** are more than orbicular, slightly cordate, smooth, thick and shiny, growing to, say, 6 by 8 or more commonly about 5 by 6 inches. The margins are generally somewhat wavy and here and there slightly scolloped. The midrib is often reddish above and below. The petiole is thick and downy and generally half-an-inch or less in length. The stipules are characteristic of the family and serve to

identify the tree. They form a complete sheath all round the twig at the point where the leaf starts and when the leaf is removed and the sheath is dry it can be twisted round the twig.

The **flowers** grow in spikes (or, rather, spike-like racemes) which run to a foot or so in length. They are abundant and very small. There are no petals, their place being taken by 5 greenish-white sepals. There are 8 protruding, white-headed stamens.

The **fruits** which grow abundantly on the spikes are round, about half-an-inch in diameter and purplish when ripe. They resemble a drupe containing a black stone, but appear to be really a nut enclosed in the calyx which enlarges and becomes pulpy. They can be eaten and are slightly sweet.

GYROCARPUS JACQUINI (or *mericanus* or *Asiaticus*)
(*Hernandiaceæ* or *Combretaceæ*)

Tamil, Taṇuku, Veḷḷai Taṇuku—*Telugu*, Taṇuku, Poṇuku, Kummara poṇuku, Bandar, Bandri, Pîdra-poliki.

This tree is pretty generally distributed but is not very common. It grows to a good size though I have never seen it "a large tree," as Drury describes it.

In several ways it is readily distinguishable. The trunk has a sort of fleshy look though it is not stout. It is covered by a smooth, thin layer of silvery skin overlying a green skin. The wood is very soft.

The **leaves** have the remarkable character of being

either entire or palmatifid. They grow on very large petioles, sometimes a foot or so long. The branchlets, petioles and the under-surface of the leaves may be downy. The entire leaf is very broadly ovate, commonly, indeed, nearly as broad as long in spite of the long acumen ; it may be as much as 11 inches long by 10 inches broad. The palmatifid leaf has 3 or 5 large pointed lobes. Both forms are more or less cordate.

The tree **flowers** when leafless and may then be covered with the yellowish, corymb-like, compound cymes on which grow the very numerous minute flowers. There are male or bi-sexual and the latter seem to be found solitary in the forks of the inflorescence. There are no petals. The calyx is yellow and has 4 or 5 segments. The 4 or 5 anther-bearing, spreading, yellow stamens are the most conspicuous part of the flower.

The **fruit** is remarkable. It is found hanging in clusters as a rule and consists of an ellipsoidal body about half an inch long and bearing 8 or 9 longitudinal ridges. Attached to the upper, that is the free, end are two long wings facing each other and close together. These wings may be over 2 inches long by under half an inch broad. They are oblanceolate in shape with the upper end rounded and are much narrowed towards the base. They consist of two of the calyx-segments which enlarge while the others drop off. The fruit contains one seed and Beddome calls it a drupe while Drury describes it as a capsule.

Santalum album (*Santalaceæ*)

Tamil, Santanam—*Telugu*, Chandanam—*English*, Sandalwood

A small, slender tree with a smooth, dark bark which has sometimes a ruddy tinge. The inner substance of the bark is red. The characteristic scent of sandalwood is not apparent in the bark, though people often chip the tree under the impression that it is.

The **leaves** are opposite, decussate, ovate-lanceolate or elliptic; the petiole is short and the blade up to about 3 by 2 inches.

The **flowers** grow in small branching cymes and are rather curious. There is a four-lobed perianth which varies in colour from whitish-green through terracotta to dark crimson and there are four whitish stamens which alternate with four orange "scales which may be regarded either as petals or as lobes of the disk" (Brandis). Occasionally, however, the above organs are in fives instead of fours.

The **fruit** (a drupe) turns black and is then like a small cherry.

There are three common members of the genus *Euphorbia* which may be styled by courtesy trees. People are apt to speak of some of the euphorbias as cactuses to which they have a sort of resemblance but the cactuses commonly have large, showy flowers, while the cactus-like euphorbias have no flowers to speak of; they have to be searched for

and are not easily recognized when found ; also the euphorbias have not the large, soft fruits of the cactuses. One of the commonest of these euphorbias has been misnamed by science—

EUPHORBIA TIRUCALLI (*Euhorbiaceæ*)

Tamil, Koḍikalli, Kombukalli, Pâchchânkalli
Telugu, Jemuḍu, Kundigi—*English*, Milk-hedge
(Foreign)

This plant is invariably called koḍikalli in Madura—at least I never heard any other name there—but I have no doubt that this name is a misnomer and due to confusion with a climbing asclepiad of somewhat similar appearance. The scientific name is tirucalli, which is a mistake, or contraction, for tirugukalli, a name which should be applied only to *E. tortilis*. It is true that a certain Brahman told me that the plant now under consideration is called tirukalli or tirugukalli in Tinnevelly but one is inclined to doubt information as to flora and fauna supplied by Brahmans who have had no special training in natural history. If it is called tirugukalli anywhere, it is wrongly so called, for tirugukalli means " twisted kalli" and the term is quite inapplicable to this plant. Its most appropriate name is kombukalli or "branching kalli." and the specific name ought, I humbly maintain, to be altered to that.

There is no commoner plant in the country but

Brandis says that it comes from Africa. It is principally grown as a hedge and, when it assumes the shape and dimensions of a small tree, it has a brown, smooth trunk. It is easily distinguished by its abundant growth of milky, fleshy, smooth, flexible, cylindrical, green branchlets which are about the thickness of a pencil. These branchlets presumably perform the functions of **leaves**, for, when there are any true leaves, they are very sparse, small and narrow.

The **flowers** are of the type referred to under *E. antiquorum*. The involucres with their 5 broad, fleshy, green glands grow in clusters in the forks, or at the tips, of the branchlets. The whole inflorescence is under half an inch long and its general colour is greenish-yellow. The most conspicuous things about it are the glands, the swollen ovary covered with white hairs and 3 stout, down-bent, yellow styles which divide, with an outward sweep, at the tips.

I have never noticed the **fruit**, so append Brandis' description of it:—"Capsules deeply 3-lobed, villous, dark-brown, quarter inch long."

EUPHORBIA ANTIQUORUM (*Euphorbiaceæ*)

Tamil, Sadarakalli, Pottâkalli
Telugu, Peddajemuḍu, Bontajemuḍu

This is very abundant, especially on dry, stony hill-sides, either as a shrub or as a small tree with a rough, brown bark.

There are no apparent **leaves** and the branches, which are green, fleshy and milky, are divided into "faces" by high, undulating ridges, the crests of the undulations bearing a pair of spreading spines which, as well as the sort of patch on which they stand, are either gray or a shiny reddish-brown.

Generally the central stem is four-faced and the branches three-faced; the latter are often slightly spiral.

The **flowers** grow at the ends of the branches, just above the thorns, in the troughs of the undulations and are remarkable though inconspicuous. One would naturally say that they possess a small, membranous, two-lobed calyx and a corolla with 5 or 6 fleshy, green petals but, in fact, this ring of fleshy 'glands' forms a mere involucre and encloses a number of distinct flowers.

These flowers are unisexual. The males consist simply of a stamen (crimson when fully developed) and a number of them surround a single, central female flower which consists simply of a pistil. The ovary of the female is borne on a stalk and develops into a largish **capsule** with 3 semi-detached carpels. the capsule looking rather like a three-cornered hat, The involucres usually grow in groups of 6 on short, thick stalks, each of which bears 3 involucres. The central involucre in each of these sub-groups is sessile and larger than the other two which are stalked.

EUPHORBIA TORTILIS (*Euphorbiaceæ*)

Tamil, Tirugukalli—*Telugu*, Tirugujemuḍu

This plant grows in the same places as *E. antiquorum* and is very like it, but it is a good deal smaller, seldom developing more than a stump for a trunk, and is decidedly rarer. It can be distinguished by the very marked screwing of the branches. Nearly all parts are three-angled but the central parts are often squared as in *E. antiquorum*. I do not, however, think that the stem or branches are ever five-faced (or according to Gamble, even six-faced), as they sometimes are in the latter plant.

The **flowers** grow on the ridges close to the thorns. They are the same in type as those of *E. antiquorum*. There is usually a short, two-branched stalk bearing on each branch 3 flower-heads, the central one being sessile. Against *Euphorbia nivulia* Brandis notes that the central involucres are male and the lateral ones bi-sexual. This is certainly not the case with *E. tortilis*, in which the lateral involucres seem indeed to contain a female flower but the stalked **capsule** develops, so far as my observation goes, in the central involucre and in that only.

PHYLLANTHUS EMBLICA (or *Emblica officinalis*) (*Euphorbiaceæ*)

Tamil, Nelli—*Telugu*, Usirika, Nelli, Âmalakamu.

As Drury fell into the mistake of supposing this

tree to possess a pinnate leaf it is pardonable for unscientific people to do the same. In fact the foliage is exactly like that of a pinnate-leafed tree but the apparent leaflets are really leaves.

The tree, which is very common on hills at about 3,000 feet and is pretty common on the plains, is small or of moderate size and has a grayish or light-brown bark which is sometimes much broken and peels off freely; when sliced the bark is of a crimson colour. The trunk is sometimes very gnarled and ridged. The largest tree I have measured was between 6 and 7 feet in girth.

The **foliage** has a light, sparse look, for, though the leaves are numerous, they are very small. The leaf-bearing branchlets are set on alternately and, on each side of the branch, the alternate branchlets are in the same plane. These branchlets vary in length up to about 18 inches. The leaves are very numerous, on very short petioles, alternate, smooth, linear, round-ended and up to about three-quarters of an inch in length.

The **flowers** which are unisexual minute and frail, grow thickly-crowded upon the deciduous, leaf-bearing branchlets and principally at their base where they are bare of leaves. There is no corolla but 5 or 6 calyx-segments which are greenish-yellow or white in colour. When the tree is in flower, before the leaves appear, the flower-covered young branchlets look like willow-catkins. The female flowers can be distinguished by the large, branched, triple style and by the fact that they are practically sessile,

whereas the more numerous male flowers are on very slender, whitish stalks.

The **fruit** (a drupe with a small, slightly-ridged stone) has a general resemblance to a gooseberry; it turns from green to yellowish or reddish, is almost spherical or depressed globose and slightly furrowed longitudinally and grows to an inch or more in diameter. Though astringent, it is sour enough to be welcome when one is parched with thirst climbing in the sun.

JATROPHA CURCAS (*Euphorbiaceæ*)

Tamil, Kâṭṭâmanakku, Veḷḷaikâṭṭâmanakku—*Telugu*, Aḍaviâmudam, Yerriâmudam, Napalam—*English*, according to Drury, "Angular-leaved physic-nut," but I never heard the name used.

(Foreign)

A mere weed, abounding about every village, especially in hedges, and usually a shrub though it occasionally becomes a very small tree. In such cases the trunk is fairly stout but very short, with a smooth, greenish skin.

The **leaves** tend to be grouped terminally and are generally distinguished by their angularity; there may be 3 or 4 or 5 points and the sides of the leaf are often sqare-cut or the leaf may be distinctly lobed. The petiole is long, sometimes up to 8 inches, and the blade which is deeply cordate may be as much as 8 inches long by 7 broad.

The **flowers** are in small, terminal, cymose

clusters, male and female distinct but found in the same cymes. There are 5 green sepals and 5 green petals, the spread being about one-third of an inch. In the male flower there rises from the yellow, 5-lobed disk a column of stamens bearing yellow anthers which turn darker. The female flower is indicated by the small, smooth, green ovary topped by 3 minute dark styles.

The **capsule**, to which is attached the persistent calyx, is ovoid and, when ripe, black. It is nearly 1½ inches long, nearly 4 inches round and slightly angled by 6 lengthwise ridges forming 3 main segments. The flesh is pretty thick in the young fruit and there are commonly 3 large, hard-shelled seeds.

ALEURITES MOLUCCANA (or *triloba*) (*Euphorbiaceæ*)

Tamil, Nâṭṭu akkarôṭṭu, Kâṭṭakkarôṭṭu
Telugu, Nâṭu akrôṭu—*English*, Belgaum walnut.

(Foreign)

A good-sized tree, to be found in gardens. It is said to have run wild in Wynaad. Its leaves serve to distinguish it as shown below. The largest tree I have seen was between 5 and 6 feet in girth and about 50 feet high but it probably grows much bigger. The bark is light-brown or greenish-gray, fairly smooth with reddish streaks or cracks, or else rough; when sliced, it is of a dull, pale crimson. The young shoots, petioles and young leaves bear a down which is white or slightly tinged

with red (this tinge may, however, be due merely to red dust).

As to the **leaves**, the petiole is very long, running to 14 inches or so. This is one distinguishing feature. Another is that the upper surface of the young, but developed, leaf is hoary or silvery and this gives the tree a dappled look. A third is that the leaf may be either lobed or not lobed. The mature leaf is dark-green above and rather shiny. The dying leaf turns yellow. The non-lobed form of leaf is ovate-lanceolate with a flat base which makes it almost triangular; it is acuminate and the edges have large teeth irregularly placed. This form of leaf may run to about 10 by $7\frac{1}{2}$ inches. The lobed leaf may have 3 or 5 large lobes and I have seen it 14 inches long by 15 broad; in this leaf the margins are irregularly dentate and the base cordate.

Both sorts of leaves have 5 basal veins and two small, swollen glands at the point where the midrib and stalk meet.

The **flowers** grow in wide-branching panicles covered with whitish down and running to about 8 inches long. They are numerous, small, white and unisexual, both sexes being found on the same tree. The small, greenish calyx splits into 2 or 3 more or less irregular lobes. The 5 petals are white, narrow, of equal width throughout and blunt ended; they have a spread of one-third to one-half inch. The stamens are short, numerous and yellow.

The **fruit** is a drupe with an outline varying from semi-circular to nearly circular. It is much com-

pressed on two sides and may be 2½ inches long. Sometimes it is so depressed as to assume a sort of mallet-head shape, much broader than long. There is generally a very short point at which cross four lines which divide the fruit into quarters. In colour it is green to brownish with a coating of white down. There are generally two large seeds which are covered with a very hard, chocolate-coloured shell over which is spread a sort of white membrane. The kernel is eaten but it has little taste.

GIVOTTIA ROTTLERIFORMIS (*Euphorbiaceæ*)

Tamil, Vaṇḍâḷai—*Telugu*, Tellapoṇuku, Manchipoliki, Tellapoliki, Pîdrapoliki

If on a windy day you see a tree with dappled foliage, white and green, it is probably this one exposing the white under-surfaces of its large leaves.

It is a small or moderate-sized tree and fairly common. The bark is gray and smoothish but pitted in consequence of scaling off. The underbark is crimson and the wood soft.

The **leaf-stalks** run to 10 inches or so in length. They and the branchlets and the leaves are covered with a thick, white, powdery down. The young leaves are greenish-yellow. The old leaves are so flexible as to feel like soft kid and they grow to about 13 by 11 inches. They are alternate, cordate, broadly ovate-lanceolate and pointed and the margin is conspicuously and irregularly jagged or toothed. There is a peculiarity about the leaf-stalks which

deserves notice as serving to identify the tree. They bear (usually in pairs) little, slender, upright processes about one-eighth of an inch long, consisting of a white stem with a green tip and resembling as much as any thing a style with its stigma. These are called stipitate glands; what object they serve, in the case of this tree, I do not know.

The tree is dicœcious, that is, bears male **flowers** on one specimen and female on another. These flowers grow in lax, slender, terminal, cymose panicles which are covered with white or yellowish powder, grow to a foot or more long and bear branches at wide intervals. These branches may be 6 inches or more long and bear few flowers which are in clusters, usually at their ends. Linear, hairy, whitish bracts are found below the branches and flowers. There are 5 white, very hairy or downy sepals almost as long as the 5 yellowish petals which more or less cohere into a stout tube enclosing the yellow-headed stamens. The calyx seems to open but slightly.

The **fruit** (a drupe) resembles a pigeon's egg in shape and size, being about $1\frac{1}{4}$ inches long by $\frac{3}{4}$ inch broad. It is greenish or grayish and covered with white down. Inside is a hardish stone containing a single seed with a black and intensely hard shell.

TREWIA NUDIFLORA (*Euphorbiaceæ*)

Tamil, Sîmapûvarasu (a misnomer), Âṭṭapûvarasu or (better) Âṭṭarasu

This is one of a set of trees which are difficult to

distinguish by the foliage—trees with large, flabby, pointed leaves.

It is common enough, especially near water, and its foliage seems to be particularly liable to disease, for the leaves are often covered with white freckles due apparently to some parasite.

The tree is generally of moderate size, say 4 or 5 feet round. The bark is smooth, light-gray or whitish with, perhaps, a touch of silver; often flaking off in patches.

The **leaves** are decussate or nearly so and grow on stalks up to 5 inches or so in length. These stalks are slender and often have a tinge of pink about them. Including the midrib there are 5 basal veins and the midrib throws out lateral veins. The blade is light-green in colour and runs to about 8 by 5 or 6 inches; it is ovate-lanceolate, sometimes slightly cordate, sometimes rather unequal-sided and has a longish acumen. Brandis observes that the young shoots, inflorescence and sometimes the full-grown leaf beneath are clothed with flocculent cottony wool; this characteristic is not apparently observable in the South Indian tree on which very little down is to be found.

The **flower** which is very small is unisexual and the males and females grow on separate trees. There are no petals, only a little green calyx, splitting into 3 or 4 segments, and, in the male, numerous short stamens. These male flowers grow in little bundles along slender, dangling stalks which may be 5 or 6 inches long and the whole inflorescence

forms a spike-like raceme. The female flowers, on the other hand, grow, generally in pairs, on a stalk an inch or less long and possess remarkable styles. These are 3 in number, united at the base, but for the most part free, much twisted, covered with minute processes (looking, in fact, like the arms of cuttle-fishes), greenish or yellowish; they are half-an-inch or more in length.

The **fruit** is a drupe with a shelly endocarp. It is greenish, very-depressed-globose in shape, an inch or so in diameter, has thick, greenish flesh and contains 4 or fewer seeds covered with a hard, black shell.

Holoptelea (or *Ulmus*) integrifolia (*Ulmaceæ* or *Urticaceæ*)

Tamil, Âvi, Âyi—*Telugu*, Nâvara, Navili, Tapasi.

Quite a common tree in some places (in parts of Madura, for instance) but presenting few identifying features. Gamble says that the fresh bark has an offensive smell, a fact which I did not notice when the tree was under my observation. The trunk, as seen by me, is grayish-brown or, sometimes, almost white, smooth and slightly buttressed, but Gamble observes that it is "gray, rough, with diagonal cracks, exfoliating in diamond-shaped scales." It is generally of moderate size, but I have seen it 12 feet in girth and it is said to grow larger. It has a rather drooping appearance, as long branchlets often hang

down bearing leaves which tend to cluster at the extremities.

The **leaves** are alternate, on short petioles, smooth and shiny and dark-green above, somewhat downy below, ovate or elliptic and sometimes end in a short point. They are very variable in size; the largest I have measured was 6 by 3½ inches. Brandis says that the leaves of seedlings and coppice-shoots are usually serrate.

The **flower** appears when the tree is leafless, growing in little clusters along the twigs above the leaf scars. They are green and exceedingly small. The perianth is divided into 5 pointed lobes and there are 8 or 9 stamens with such large anthers that they may easily be mistaken for clawed petals. The flower may be male or bisexual. The latter is indicated by the curious flat, two-horned ovary growing on a stalk which lengthens as the seed ripens.

The **fruit** is botanically described as a *samara*, which is a fruit with the pericarp compressed and expanded into a wing. When ripe it is a biscuit-coloured, papery thing, almost circular, about 1½ inches across and growing on a very slender stalk. Near the middle is the cavity which should contain the seed, but it is commonly empty.

The figs of Southern India are numerous and are readily distinguished from other trees when in fruit.

It is perhaps hardly necessary to say that the so-called fruit is not, properly speaking, a fruit at all but consists of a swollen floral receptacle, the rim of which is drawn upwards and inwards to form a case which is entirely closed save for a little hole at the top and which contains the numerous flowers. Some common sorts of fig-trees are described below.

Ficus religiosa (*Moraceæ* or *Urticaceæ*)

Tamil, Arasu, Asvattam—*Telugu*, Râvi, Râgi, Aswarttam—*English*, Sacred fig, peepul (the Hindustani).

Very common everywhere and recognizable at once by the very long, slender tails to the leaves. These are lightly-hung, long-stalked, light-green and so glossy that on nights of the full moon they sparkle like jewels. They are broad and almost square at the base, slightly cordate, and narrow gradually, with wavy margins, to the tail. A very large leaf with a total length of $11\frac{1}{4}$ inches had a stalk of 4 inches and a tail of $2\frac{3}{4}$ inches. The young leaves are of a pretty, ruddy tinge. The figs are round, with a diameter of about half-an-inch, grow sessile in pairs and turn blackish.

The largest specimen of the tree which I ever saw had a girth of just under 34 feet, but this is quite exceptionally big. The trunk is smooth and gray or grayish-brown.

FICUS INDICA (or *Bengalensis*)

(*Moraceæ* or *Urticaceæ*)

Tamil, Âlan—*Telugu*, Marri

English, Banyan

I venture to revert to Roxburgh's name which is surely much more appropriate to the most characteristic tree of India than to a little-known Burmese species. The finest banyans I know are both in Madura district, one at Mêlûr and the other in Madura town. The latter overshadows an area with a circumference of about 300 paces. The former has a smaller spread but is in some ways still more striking. As an avenue tree it is incomparable but the grand century-old banyans of the avenues are giving place too often to such wretched substitutes as the rain-tree. There is no need to describe the tree which everybody knows, but it is often supposed that all the trees with hanging air-roots which one comes across are banyans. As a fact there are several fairly common figs which drop such roots and these I shall attempt to describe below, though I confess that I am not at all confident of my identifications in some cases. Generally it may be said that the trees which follow can be

readily distinguished from the banyan (1) by their air-roots which are much slimmer and often resemble great tresses of coarse and, sometimes, wavy hair, and (2) by their leaves which are much smaller than the great, coarse, ovate banyan leaf with its prominent white veins and blade growing to 9 by 6 inches.

(1) *Ficus retusa*.—This is commonly called *Kalichchi* in Madura, but I believe that name properly applies to *F. arnottiana*. The leaves are dull and small (up to about 3 by $1\frac{1}{2}$ inches), sometimes elliptic and slightly lanceolate but commonly obovate and round-ended; occasionally slightly emarginate. The veins are but faintly marked and are not numerous. It throws down multitudes of thin air-roots and the figs grow in pairs, go reddish and are about the size of a pea. In the case of a tree very similar in general appearance but having an elliptic leaf which commonly bears a short, rounded point we have probably come on *Ficus retusa* variety *nitida* (yerra juvvi in Telugu). The names are singularly badly chosen. The leaf of *retusa* is rarely retuse or emarginate and the tree should be called *obtusa*. The leaf of *nitida* is not conspicuously shiny and the epithet would rather indicate *Benjamina*.

(2) *Ficus benjamina* (Java fig). The leaf is rather larger than that of (1) running to, say, 4 by 2 inches. It is very glossy and in shape elliptic or slightly ovate, narrowing to a marked acumen which is often bent to one side. The veins are

parallel, very fine and very numerous. The figs, about the size of a pea, grow in pairs and are coral-red.

(3) *Ficus comosa.* The leaf closely resembles that of (2) but is perhaps a trifle larger and the acumen may be as much as three-quarters of an inch long. The main difference is in the figs, which are much larger, flask-shaped or globular with a diameter of three-quarters of an inch or so, and, when ripe, bright yellow.

(4) Besides the above there is in Madras a common avenue fig which the people call *Kuriviyâlan* and which persons who ought to know declare to be *F. tsiela.* It is a fairly stout, smooth, gray-barked tree which lets down large, stout air-roots especially from the bases of the boughs. The trunk is rather irregular in shape and, though the tree has some general resemblance to *tsiela,* it is a commonplace and unbeautiful copy.

The leaf is hard, smooth, up to about 6 inches in length, ovate-lanceolate or oblong-lanceolate, shortly acuminate, the point being sometimes bent to one side; the margin is slightly wavy; the main lateral veins about 10 a side; the petiole 2 or 3 inches long; the petioles and young shoots slightly downy; the base of the blade tapers to the petiole which, as it were, overlaps the base of the midrib.

The fig is, in size, between a very large pea and a cherry; it is globular and turns blackish when ripe. Now Gamble and King both declare that *tsiela* has *no* air-roots and that has been my experience too. I seem also to find that the leaf of *tsiela* is darker,

glossier and less tapering at the base and that the petiole is always smooth. I am therefore strongly inclined to believe that the tree is not *tsiela*, but I have no idea what it is.

FICUS TSIELA (*Moraceæ* or *Urticaceæ*)

Tamil, Ichchi—*Telugu*, Zuvvi, juvvi, jivvi

A grand and beautiful tree, common in avenues. I have measured it over 33 feet in girth in the fine avenue between Toppampaṭṭi and Nattam in the Madura district. It is, as a rule, readily distinguishable by the delicate, greenish-gray colour of the very smooth bark and by the colossal sinews, as it were, which ridge the trunk and larger branches. The boughs are very often flattened-oval in section. Sometimes the trunk is tinged with gamboge-yellow.

The leaf and fig are described under *F. glomerata*.

FICUS GLOMERATA (*Moraceæ* or *Urticaceæ*)

Tamil, Atti—*Telugu*, Atti

This is by no means a handsome tree but it may be mistaken sometimes for an inferior specimen of *F. tsiela* and it is not easy to describe the differences between them.

The trunk is smooth and gray with a greenish, yellowish or rusty tinge, but it has not the conspicuous lightness and smoothness of bark which *tsiela* possesses. *Tsiela* has a very shapely, ovate leaf tapering to a more or less pronounced acumen

and attached to a green petiole which may be 2 or 3 inches long. The acumen may be oblique. The margin is very slightly crenate and generally rather wavy towards the tip. The under-surface of the blade is pale-green and dull. The upper surface is shiny and rather dark. The blade runs to about 5 by 3 inches. The veins are lightly marked and are not numerous. *Glomerata* on the other hand has a brownish petiole in the specimens examined by me and its leaf seems to be a little larger (say up to 6 inches long) ; this leaf is ovate or elliptic-lanceolate, dark-green, dull and often marked with discoloured patches ; it rapidly loses colour after being picked and turns almost white, but this, I believe, is not unusual among the figs. On some specimens, however, the leaf is oblong-lanceolate and much smaller than the measurement given above.

The largest *glomerata* measured by me was 12½ feet in girth. The bark on the lowest part often breaks off in small patches, giving a blotchy look. The trunk of this tree, like that of the banyan, is frequently covered with small pits made by people extracting the milk for medicinal and other purposes. (This is noticeable in the case also of Kuriviyâlan, referred to under *F. indica*.)

The figs of *glomerata* grow in crowded clusters on very short stalks out of the trunk and branches. They are nearly round and larger than in most of the Indian figs but generally only an inch or so in length. They are eatable but have little taste and are commonly swarming inside with the little flies

which serve to carry the pollen from one fig to another. The figs of *tsiela* are smaller, and do not grow in clusters and are not eaten.

Artocarpus incisa (*Moraceæ* or *Urticaceæ* or *Artocarpaceæ*)

Tamil, Sînipalâ, Suratpalâ, roṭṭaipalâ (Roṭṭaipalâ seems to be used of the seedless variety and the other names of that with seeds)—*English*, Bread-fruit.

(Foreign)

Not uncommon in gardens. It is usually a small tree, but is sometimes of moderate size and has a darkish, smooth, straight pole and occasionally the spreading branches have an upward curve. The bark is sometimes marked with reddish streaks. The largest specimen I have measured was 4 feet in girth and about 40 feet high.

The **leaves** are very large, growing to about 2 feet long by about 1 foot broad on stalks about 2 inches long. They are pinnatipartite (deeply pinnatifid) with a varying number of lobes (11 is the largest number I have seen).

The **flowers** are unisexual, both male and female growing on the same tree. The inflorescence is peculiar. The males grow in a dense conglomeration and form a dangling, fleshy, flattened spike which turns yellow and may be as much as a foot

long (excluding a 3-inch stalk) and about 3 inches round. When young this sort of catkin is found packed away with leaves in a long, green, pointed sheath. The female flowers are similarly packed in a dense mass but the spike is short, erect and club-shaped. The flowers need a microscope for proper examination.

The **fruit** may have a smooth surface (the so-called seedless variety) but it is commonly covered with a thick growth of small, green tubercles. The fruit is formed out of the receptacle and the cohering fleshy perianths of the female flowers and it is the tips of these perianths which protrude as conical tubercles. The fruit is round and grows to about 5 inches in diameter. The flesh is white and the seeds large and brownish. It does not seem to be much used as food by the natives even where it is known. I have heard, however, that it is eaten commonly in Malabar, but in Madura the use of the fruit seems to be restricted to the eating of the seeds in curry.

ARTOCARPUS INTEGRIFOLIA (*Moraceæ* or *Urticaceæ* or *Artocarpaceæ*)

Tamil, Palâ—*Telugu*, Panasa—*English*, Jack

Gamble describes the tree thus :—"A large, evergreen tree. Bark thick, blackish, deeply cleft when old." But in general, on the East Coast, it is a moderate-sized tree with a smooth, grayish or light-brown, thick bark which is often, indeed, cracked deeply

but without rendering the surface rough. It is not a very easy tree to distinguish at first unless it happens to be in fruit. The sap is milky and sticky.

The **leaves** are dark when old, alternate, set all round the stem, glossy above, paler below, stiff, slightly pointed, elliptic but tapering towards both ends or broadly elliptic or slightly obovate or almost oblanceolate, in length running to about 8 inches, in width varying much. The margin is generally more or less wavy. The veins are yellowish and well-marked. The petiole is an inch or less in length. There are very long, narrow stipules which drop early.

The **inflorescence** is of the same type as that of *Artocarpus incisa*. On thick stalks out of the trunk and boughs there grow the male and female spikes. The male spike, covered with a dense mass of minute flowers, grows to 2 or 3 inches in length in an irregularly cylindrical form. It is green at first, is then covered with yellowish stamens and finally turns black and drops off. The female spike is stouter and rounder. Its closely packed flowers produce by amalgamation the gigantic collective **fruit** which is said to attain a weight of 60 pounds. This fruit is obovoid or roughly ellipsoidal in form and is covered with tubercles representing the tips of the perianths. The young flower-heads or spikes are enveloped in a green sheath which turns brownish, splits and drops off.

The flower-head and young fruit have a sweet smell. This unfortunately does not last, the old

fruit having a very disagreeable odour, to put it politely. The flesh is sweet and the seeds, when boiled, are not at all bad eating.

CASUARINA EQUISETIFOLIA (or *muricata*)
(*Urticaceæ* or *Casuarinaceæ*)

Tamil and *Telugu*, Chowki

(Foreign)

The tree is easily recognized by its being the only one on the plains of Southern India which resembles a fir tree in foliage and infrutescence. The long, thread-like, jointed green branchlets perform the functions of leaves and it is rather misleading, no doubt, to put in the "simple leaf" section plants which have no true leaves at all.

The **flowers** are unisexual and sometimes a tree will bear only male or only female flowers, while sometimes the same tree bears both. The male flowers grow in cylindrical, lax spikes, which form at the ends of the leaf-branchlets. These spikes or catkins are an inch or two long, scarcely thicker than the branchlets, whitish in colour with a sort of short, brown moss or fur on them. The female flowers grow in small, stalked, ovoid spikes which appear on the stems between the leaf-branchlets. This inflorescence looks like a simple, small flower composed of crimson hairs which turn brown later on. Both the male and the female flower require a microscope for examination.

The female spike enlarges and becomes a green (ultimately brown), globose, hard, woody body about three-quarters of an inch in diameter which is studded with conical points; these protuberances finally open into two valves and discharge the seed.

Bifoliolate Leaves

BIFOLIOLATE LEAVES

BALANITES ROXBURGHII (or *ægyptiaca*) (*Simarubaceæ* or *Amyridaceæ*)

Tamil, Narivelân (a name given to me but probably a misnomer), nanjunḍâ—*Telugu,* Gâra, ingalumullu, ingala.

I have met with this tree only rarely but I believe it is pretty common in some places. A small tree with brown (Gamble says 'gray') bark and drooping long, stiff, green sprays of foliage. The branchlets consist of numerous, long, green spines bearing leaves and flowers. The leaves are compound, consisting of two leaflets which are small (under an inch long), elliptic or oblong, of dull green. The petioles are very short.

The **flowers** measure half-an-inch or so in spread. They grow generally in clusters, on short, slender peduncles. There are 5 (sometimes 6) small sepals and 5 (sometimes 6) narrow, greenish petals. The sepals and petals are thrown back, exposing a flat ring of 10 stamens round a green cushion surmounted by a little nipple and a very short style.

The **fruit** is a drupe about $1\frac{1}{2}$ or 2 inches long. At first it is cylindrical; afterwards it swells to the shape of a broad ellipsoid (say $4\frac{1}{2}$ inches round),

flattened at both ends and marked with 5 lines radiating from the apex. The stone is hard and woody, in texture resembling the wood-apple. The old fruit is rather like a black, shrivelled date and its black, gluey flesh smells rather like liquorice. Brandis calls the smell " offensive and greasy "; I have noted it as sweet.

The leaf of the Bauhinias is their distinguishing feature; it resembles a camel's foot in shape, appearing to be a single leaf cleft at the base and apex, but in reality it consists of two partly-joined leaflets. The connate leaflets are hereafter referred to as the leaf.

BAUHINIA RACEMOSA (*Leguminosæ—Cæsalpinieæ*)
Tamil, Âtti—*Telugu*, Âre

Outside gardens this is the commonest species. It is generally a small tree but I have seen it 4½ feet in girth. In small specimens the bark is grayish but in big ones brown and much cracked. It branches widely and irregularly. The branchlets are grayish.

The smallness of the **leaf** and flower serves to distinguish this from other species. The former is generally only about an inch and a half long and a little more wide. On a tree growing in the shade, however, I have found the leaf 3¾ inches long by 4¾ inches broad, but that is a quite exceptional size. The petiole is slender, an inch or so long. The leaves are palmately nerved, as is usual in this genus.

The **flowers** grow in racemes which may be 6 inches or so long. The green calyx is of the spathe-like form common in this genus. The petals may run to three-quarters of an inch long but are usually smaller and are very narrow; they are white and not all of the same length. The stamens may run to about half-an-inch in length, are 10 in number and woolly at the base and have large, feathery anthers.

The **legume** is thick and coarse, curved or warped, and running to about 10 inches long by an inch or so broad.

BAUHINIA PURPUREA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Maṇḍâre, sevappumaṇḍâre
Telugu, Kanchânam, Peddaâre

This is very common in gardens and is generally a small, slender tree with grayish-brown and sometimes rather rough bark.

The **leaf** is deeply divided at both ends, is coarse, rather dark and very large, sometimes over 6 inches long by rather more broad. The radiating veins are numerous.

The **flower** is scented and grows in racemes. There is a large, green five-ribbed calyx which resembles a spathe and splits away either to one side or to two sides to set free the rest of the flower which it entirely covers when in bud. There are 5 narrow, loose, flaccid petals of maroon colour, clawed, reaching 3 inches in length by 1 inch broad. The developed stamens are usually 3 but sometimes 4 ;

they have rose-coloured filaments and yellow or greenish anthers and curve over the stout, pinkish pistil.

The **legume** turns black, is flat, flexible when green, and acuminate or beaked and runs to over 12 inches in length by 1 inch in breadth.

But there is another variety of this tree—the *B. triandra* of Roxburgh—(Vellaimaṇḍâre or Pannîr maṇḍâre in Tamil) in which the petals and stamens are white. I seem to find in this variety that the leaf is smaller, softer and lighter in colour and that the bud has not the deep calyx-folds of the maroon-coloured variety but these differences may be imaginary or I may have got hold (I do not think so) of another species altogether.

Another little tree with large leaves has a handsome, scented flower 4 inches or so in spread. The petals are 2 inches or more long by an inch or more broad. Four of them are white, mauve or pale-magenta, and the fifth is then yellowish (sometimes it appears purple), pale-purple or crimson, as the case may be. This tree is *B. variegata.*

None of the Bauhinas that I know has so pretty a flower as *B. tomentosa* which, as a mere shrub, does not come within the scope of this work. A reprehensible prudery, however, keeps this flower always half-closed and forbids it to display the beauty of its graceful, yellow stamens and of its primrose petals of which one is decorated inside with a purple-black blotch.

With 3 to 5 Leaflets

WITH 3 TO 5 LEAFLETS

Niebuhria linearis (*Capparidaceæ*)

Tamil, Îruvalli, gutentu

This is rare and should not perhaps have been included in this work. But, if seen in flower, it arouses curiosity by reason of the strange fact of the fruit growing on a stalk rising out of the middle of the flower. It is a moderate-sized tree with gray bark slightly and finely creased horizontally.

The **leaf** is trifoliolate (Brandis says that there are 3 to 5 leaflets but I have always found trifoliolate leaves). The common-petiole is slender and an inch or two long. The leaflets are either perfect examples of the lanceolate or so narrow as to be almost linear. They are smooth, dull and lightish-green. The terminal or middle leaflet is the largest and runs to 3 inches in length.

The **flowers** grow in terminal racemes of a corymbose type. There are 4 small, green sepals (or calyx-lobes) with a spread of about half-an-inch; the petals are wanting. In the middle of the flower, from a tangle of long, thread-like stamens (white turning to yellow in colour), there projects a pink stalk an inch or so long bearing the ovary at its end. This is called the gynophore and its presence is characteristic of the caper family. The raised ovary

develops into an ellipsoidal **berry**, half-an-inch or so long, pointed at the end. It contains a single seed and is said to go yellow but I have not seen it in a ripe state.

Cratæva religiosa (or *Roxburghii*) (*Capparidaceæ*)

Tamil, Mâvalingam
Telugu, Usiki, ulimiḍi, urimiḍi, urumiṭṭi

The specific name is apparently derived from the fact mentioned by Drury that the tree is regarded as sacred in the Society Islands. It is usually a small tree but I have seen it 6½ feet round. The outer skin of the bark is smooth and greenish-gray or gray (sometimes with a silvery look). The inner skin is green and the bark, when sliced, shows an orange-coloured veining. The trunk may be wrinkled horizontally. The tree is fairly common.

There are 3 **leaflets** which are ovate-lanceolate or elliptic-lanceolate and acuminate; the lateral ones are unequal-sided; the terminal which tapers at the base may be as much as 4 or 5 inches long. The slender common-petiole also may be 4 or 5 inches long. The bases of the leaflets are close together and the petiolules are very short.

The **flowers** grow on long stalks in corymbose clusters or groups of corymbs. The 4 sepals are wide-spreading, oblong, acuminate. There are 4 petals and they crowd to one side in such a way as to suggest that a petal or two has fallen off. The

petals are creamy and nearly an inch long with long, slender claws; the blades of the petals are elliptic, veined and resemble leaves in the young flower where they are greenish. There are numerous, long, drooping, pale-lilac, yellow-headed stamens surrounding a gynophore with a slender, pinkish stalk which may reach 1½ inches in length. The flowers make a pretty show when the tree is in full blossom.

The **fruit** is a big, orange-coloured berry which has a hard rind, is ovoid or globose in shape and 2 or 3 inches in diameter and grows on a thick stalk several inches long.

ÆGLE MARMELOS (*Rutaceæ* or *Aurantiaceæ*)

Tamil, Vilvam—*Telugu* Bilvamu, Mârêḍu
English, (Hindustani) Bael

This tree, common in temple-enclosures, must not be confused with the closely allied *Feronia elephantum* which it resembles in general appearance. Various differences will be noted in the course of the descriptions of these two trees but it will be enough to mention that *Feronia* has commonly a winged petiole and that its leaf, when bruised, has the aromatic smell of paregoric (the distinguishing aroma of the cough-lozenges of childhood), while the petiole of *Ægle* is unwinged and the leaf has a disagreeable odour. I have seen the tree 8 feet in girth but it is not as a rule a tall tree. The bark is brown, rough and sometimes deeply cracked. The tree bears sharp, straight spines.

As a rule the **leaves** consist of 3 leaflets (I have never seen more) and they often grow in clusters of two or three on what appear to be arrested branchlets. The leaflets are usually oblong-lanceolate or elliptic-lanceolate and taper towards both ends; occasionally they are somewhat obovate. They are of pale, dull green and run to about 3 inches by 1 inch.

The **flowers** are fragrant. They grow in panicles which are stiff and usually about 3 or 4 inches long. The lower branches of these panicles grow from the axils of leaves. The flower has a spread of nearly $1\frac{1}{2}$ inches. The calyx-tube is green, short, flat, very slightly indented round the rim. The petals, 4 or 5 in number, are wide-spreading, oblong, rather fleshy, externally green with a white border, internally white. The stamens are numerous; the white filaments run to nearly half-an-inch in length; the anthers are brownish, long, linear in shape. The style is thick, green, nearly half-an-inch long, constricted towards the middle.

The **fruit**—a berry—is much the same size as that of the wood-apple, but it is commonly egg-shaped and the hard rind is smooth and green with, when ripe, a tinge of yellow. A common size would be about 4 inches long by 8 or 9 round. The flesh has an agreeable smell, it is pale orange in colour and contains numerous seeds immersed in a clear, glutinous stuff. Drury found the fruit "very palatable"; it certainly does not merit this epithet in the raw state.

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Balsamodendron berryi (*Burseraceæ*)

Tamil, Nâṭṭukiḷuvai, Muḷḷukiḷuvai, parakiḷuvai
Telugu, Guggilam (?)

This tree is very common in some places; it is much used for hedges on account of its thorniness. It grows into a sturdy, little tree with a thick-set, rounded crown, somewhat resembling a crab-apple tree. The trunk is grayish and usually smooth and the tree can generally be recognized by the trifoliolate leaves and by the fact that the branchlets consist of leaf-bearing spines. It is said to be fragrant but I have not noticed anything fragrant about it. One is liable to confuse a young specimen of this tree with the common garden shrub henna (Maradândi, Lawsonia alba) and with veḷḷaipulla which in science bears the "soft, meandering name" of Fluggea leucopyrus; but neither of these shrubs has a trifoliolate leaf.

The **flowers** grow in numerous, small clusters on the spinescent branchlets and are about a quarter of an inch long. They are either bisexual or unisexual. The calyx-tube is pink and has 4 teeth. The 4 petals are narrow, crimson or purplish and grow erect and close together so as to look like a corolla-tube. There are in the male flower 6 stamens of which 4 are nearly as long as the petals and the rest shorter. The anthers are yellow.

The **fruit** (a drupe) runs to about half-an-inch long and turns red when ripe. It is almost sessile, contains a hard stone, is roughly ellipsoidal but

somewhat flattened and has a very small spike at the end. It is curious (though such botanical discernment is not uncommon in vernacular nomenclature) that the Tamil name of this tree should correctly associate it with *Protium candatum* which is so unlike in appearance.

ERYTHRINA INDICA (*Leguminosæ—Papilionaceæ*)

Tamil, Mullumurugai, Kaliyânamurukkan
Telugu, Mullumôduga, baḍaḍam, bârjam, alawân
English, Coral tree

A common tree, usually of small size but I have seen it over 5 feet in girth. The bark is smooth or shows shallow cracks and in colour is greenish-white or gray or almost quite white. The prickles on the trunk and boughs serve to distinguish it; they are small but have big bases and are often black.

The **leaves** are trifoliolate, the terminal leaflet being widely separated from the lateral ones. The common-petiole, up to the base of the terminal leaflet, may be a foot or more long. Just below the opposite, lateral leaflets are two lumps or glands and there is a similar pair just below the terminal leaflet. A pair of small, narrow stipules stick out at the base of the common-petiole. The leaflets are dull and smooth. The terminal leaflet is curiously shaped, for it is commonly broader than long and so much so as to assume sometimes almost an elliptic form with the midrib as the shorter diameter; it bears, however, a point at the apex. A common maximum size of

this leaflet would be 4½ inches long by 6 broad but I have seen it 8 inches long by 7⅔ broad. The lateral leaflets are smaller, unequal-sided, pointed and commonly about as broad as long; the largest I have measured was, however, 7 inches long by 5⅓ broad; The tree sometimes makes a brilliant display with its scarlet blossoms ablaze against the pale blue sky.

The **flowers** are in thick-grown racemes; the peduncle runs to a foot or more in length and on it the flowers are set is a whorled or bundled arrangement. The pedicels are half-an-inch or so long. The calyx splits to one side to set free the scarlet corolla, stamens and style. The standard is oblong and nearly 3 inches in length. The wings and keel are comparatively short (about three-quarters of an inch). The stamens and style are about as long as the standard. The stamens form a sheath round the style—nine of them are joined for about half their length, the tenth is free for most of its length.

The **pod** goes black. It may be a foot or so in length and is cylindrical but markedly constricted between the seeds which may number a dozen or fewer. The seeds are sometimes very irregularly spaced. The pod at the two ends curves to points, the upper one often much bent and resembling the sting of a scorpion.

BUTEA FRONDOSA (*Leguminosæ—Papilionaceæ*)

Tamil, Malaiporasu, Porasu, Murukkan, Kâṭṭumurukkan, Palâs—*Telugu*, Môduga

A small or moderate-sized tree, often misshapen

and ill-grown; bark light-brown or grayish and smooth or somewhat broken.

The common-petiole of the three **leaflets** may be 6 or 7 inches long. The terminal leaflet is shaped differently from the lateral ones. The former is about as broad as long (say 5 inches or so), gradually increasing in width from the stalk and then abruptly rounded off; it is often slightly emarginate. The lateral leaflets form a sort of rough (mathematical) oblong, the midrib crossing the blade nearly diagonally. Brandis describes them as "oblique-ovate" which description serves well enough but hardly brings out the rather squared appearance of the blade. The stalks are somewhat downy.

The **flowers** grow in little clusters combining to form stiff, branching racemes, or panicles, of a good size. The pedicels are an inch or so long and they and the calyx are somewhat velvety and of a fine glossy, bronze-green colour. The calyx tube is half-an-inch or so long and 4- or 5-toothed or lobed. Following the curve of the keel the flower may exceed 3 inches in length and it is of the usual papilionaceous type, with a big 'standard,' two long but narrower 'wings' and a much-curved, boat-shaped 'keel' the sides of which are composed of two petals which closely embrace the 10 long stamens whereof 9 are united to sheathe the still longer style. The outside of the corolla bears a silky, silvery down. The bud is salmon-coloured and the open bloom scarlet and salmon. The whole flower rather resembles a lobster's claw.

The **fruit** is a legume growing to about 6 inches by nearly 2, covered with a thick, white, velvety down. There is one large, flat seed at the upper end which opens; the rest of the pod is flat, indehiscent and covered with a net-work of veins. When ripe the pod is of a fulvous colour.

PTEROCARPUS SANTALINUS (*Leguminosæ—Papilionaceæ*)

Tamil, Sandanavêngai, Segappusandanam
Telugu, Chandanam, Yerrachandanam
English, Red sanders

Outside a small region the tree is rare but, as I have notes about it, they may as well be given. It is of medium size with broken, rough, brown bark, cracked into square scales. There may be oozings of ruby gum and, though the underbark is whitish when first sliced, it soon turns red.

There are 3 **leaflets** (4 or 5 are said to occur now and then). These are smooth, shiny, with numerous veins. The terminal is the largest and grows to about 4½ inches long. The common-petiole may be 3 inches from its base to the base of the terminal. The shape of the leaflet is variable, elliptic or somewhat ovate or rotundate or obovate; emarginate, sometimes markedly so. The under-surface of the leaflets is pale.

The **flowers** grow in racemes which may be 7 inches or so long and simple or panicled. The flower may be three-quarters of an inch or so long;

the green calyx-tube is about one-third of an inch long, is slightly curved and has 5 teeth ; there are 5 crinkly, yellow petals whereof the keel is small, while the standard may be half-an-inch long and broad.

The **fruit** is a samara with a straight-cut base but otherwise circular. It is about 2 inches in diameter, is very unequal-sided relatively to the stalk, is swollen in the middle and is surrounded by a thin wing. When ripe it is brown and the centre is then fibrous and very tough.

PITHECOLOBIUM DULCE

(See under Bipinnate leaves)

BIGNONIA (or *Tecoma*) MEGAPOTAMICA

(*Bignoniaceæ*)

(Foreign)

Not mentioned in any of the Indian botanical works which I have seen.

It is often seen in Madras gardens but rarely elsewhere so far as I know—a brown or gray (occasionally rather silvery) tree with a smooth but tubercled, and sometimes narrowly furrowed, bark. Say up to 3 or 4 feet in girth and 40 or 50 feet high.

The **leaves** are opposite and decussate. The common-petiole runs to 4 inches long and the 3 to 5 leaflets lie in nearly the same plane as the common-petiole, by which I mean that the petiole does not

carry the leaflets as a sort of crown, joining them from underneath, as is the case with true digitate leaves. The terminal leaflet has a stalk which may be between 2 and 3 inches in length. The stalks of the other leaflets diminish in succession, the lowest leaflets being nearly sessile. The leaflets are smooth and glossy, oblong or elliptic, tapering towards both ends but bluntly pointed; in size, they decrease downward; thus, in a large leaf, the terminal was over 7 by over 2 inches, the next lateral 6 by over 2 inches and the lowest lateral $3\frac{1}{2}$ by $1\frac{1}{2}$ inches.

The **inflorescence** is a terminal cyme of 3 flowers on a stalk about an inch long. The length of the flower may be about 3 inches and its spread 2 or more. The spathaceous calyx-tube is about half an inch long, splits into two lobes and has a notched edge. The corolla-tube is pale-yellow inside and out, but streaked with pink within; the 5 large, soft, uneven-edged, crinkly lobes are of very pale lilac or mauve tinged with pink towards the centre. The 4 developed stamens grow on the corolla-tube and, with the pistil, are concealed in it.

The **fruit** is a slender, cylindrical, pointed vessel growing to 7 or 8 inches in length. It turns brown and splits into valves, exposing a long partition or dissepiment on both sides of which are closely packed the very numerous, flat seeds; these have a white, transparent wing at each end and, with the wings, they measure about three-

quarters of an inch in length by about a quarter of an inch in breadth.

Crescentia alata (*Bignoniaceæ*)

(Foreign)

A small tree occasionally seen in gardens and so remarkable in appearance as to merit description.

Though its name is so suggestive of Islam, the tree bears all over it the symbol of the rival Faith. The **leaf** in fact forms a perfect cross. The petiole is winged and, as the wings widen towards the apex and are veined, resembles a leaf. From the top of the petiole proceed a long, narrow terminal leaflet and, at right angles to the terminal, two lateral leaflets. In a large leaf the petiole may be 6 inches long, the terminal 5 inches and the arms of the cross 3½ inches. The side leaflets are obovate or oblanceolate, blunt-ended and emarginate. The terminal is curiously shaped. The blade broadens for some distance, then becomes suddenly narrow and almost straight-sided and then broadens again to the end which is blunt and emarginate. The leaves are glossy and dark-green and grow profusely, in tufts or solitary, out of little lumps on the trunk and boughs.

The **flowers** also grow out of the trunk and boughs on short stalks. They are about 2½ inches long with a spread of 2 inches or so. The calyx is small and two-lobed. The corolla-tube broadens to an inch or so in width, then contracts and finally opens into 5 lobes, the notch between one pair being only

shallow. The outside of the corolla is greenish, streaked and veined with red or crimson below and pale-crimson above; the interior of the tube is green and the wrinkled lobes are streaked and veined with crimson inside. There are 4 protruding, double-headed stamens which are attached to the corolla-tube. The pistil is generally longer than the stamens and broadens at the tip into two flat lips.

The **fruit** is smooth and looks like a large yellow-ochreish or light-brownish egg. In length it is about 4 inches and in circumference about 10 inches. The calyx is adherent. There is a hard, thin shell and the interior consists of a pulp which goes black and smells like the wood-apple.

Vitex negundo (*Verbenaceæ*)

Tamil, Nochi, Vellainochi—*Telugu*, Vâvili, veyala, lakkali—*English*, Five-leaved chaste tree (according to Drury, but I never heard the name used).

There are several species of the genus *Vitex*. I select the commonest for description. *Vitex pubescens* can be distinguished by its tawny down and *Vitex altissima* by the curious, wing-like appendages to the petioles; these appendages are broad at the base and taper off, sometimes running the whole length of the petiole.

Vitex negundo is a shrub or small tree commonly found alongside streams and channels. It has a gray bark. The branchlets are squared and downy

The **leaves** are opposite. The leaflets number 3 to 5. The common-petiole is 2 or 3 inches long. The middle leaflet has a petiolule up to about an inch long; the lateral leaflets have shorter petiolules, the lowest pair being sessile. The terminal leaflet which is the longest has a blade which grows to about 7 by 2 inches. The leaflets are lanceolate, acuminate, entire (Brandis, however, says "entire, toothed or pinnatifid"), covered underneath with a silvery or hoary down, more or less fragrant when bruised.

The **flowers** which are very small grow in somewhat compressed, terminal and axillary, compound cymes running to about 6 inches in length. There is a small, green, toothed calyx; the corolla-tube is purplish-lilac, downy within, 5-lobed (one lobe much larger than the rest); 4 stamens with white filaments and purple anthers and a white style.

The **fruit** is a very small drupe, about the size of No. 4 shot. It changes from green, through dark-red, to black. The calyx is persistent on the fruit.

Pinnate Leaves

PINNATE LEAVES

Averrhoa bilimbi (*Geraniaceæ*)

Tamil, Bilimbi or puḷichai

(Apparently foreign)

A small, smooth but lumpy tree with gray or light-brown bark; distinguishable at once by the peculiar growth of the flowers.

The **leaves**, in tufts at the ends of the scarred branchlets, are alternate and unequally pinnate with slender common-petioles which run over a foot long and bear a tawny down. The petiolules are very short. The leaflets, up to 15 pairs or so, are opposite or sub-opposite or alternate, set on in the same plane, rather tawny when young and a dull light-green afterwards. They are sometimes yellow, presumably when about to fall. They are oblong and acuminate, slightly unequal-sided and grow to about 3 inches by three-quarters of an inch. The leaves, petioles and young shoots are somewhat downy. The foliage is decidedly pretty.

The **flowers** appear in short racemes on the trunk and branches, a remarkable feature of the tree. The blossom is about half an inch long, violet in the bud, crimson-purple when open, the general effect being crimson. There are 5 sepals, persistent as a glance at the fruit shows, 5 petals, 10 stamens, of which 5 are longer than the rest and 5 styles.

The **fruit**, a small-seeded berry, is an irregular ellipsoid with 5 faces. It grows to about $2\frac{1}{2}$ inches long by $2\frac{3}{4}$ inches round and turns yellow. The styles are long persistent at the end of the fruit. The green fruit is eaten raw or cooked. It has a pleasantly acid juice.

AVERRHOA CARAMBOLA (*Geraniaceæ*)

Tamil, Tamarttan—*Telugu*, Tamarattamu

(Foreign)

A very small tree, planted for the fruit. The biggest I have seen was only 2 feet or so in girth and 20 feet or so high. The bark may be light-brown and smooth or dark-brown, cracked and rough.

The **leaves** are unequally pinnate, alternate, numerous. They are slightly and slowly sensitive. The common-petiole or rhachis is slightly downy, slender, brown, running to about 7 inches in length. There may be 6 pairs of leaflets which are opposite, sub-opposite or alternate, have very short stalks and increase in size as they approach the apex, the terminal leaflet being the largest and running to nearly 4 inches long by over $1\frac{1}{2}$ inches broad. They are dull-green, elliptic or ovate, acuminate, smooth and (in the case of the lateral leaflets) somewhat unequal-sided.

The **flowers** (a quarter of an inch or so long) grow in axillary panicles which may be solitary or clustered; the panicles have very slender stalks and are an inch or two long. The 5 sepals are crimson and

pointed. The corolla-tube is white but its 5 lobes are purple. The stamens are inconspicuous, the 5 inner longer and bearing anthers, the 5 outer infertile (sometimes at all events). The styles number 5.

The **fruit** (a berry) is curiously shaped, it runs to about 4 inches in length and about 8 inches in circumference and is distinguished by 5 very high, narrow, longitudinal ridges. It is shiny, turns yellow and contains a lot of juice and a few (sometimes only one) small, flat, brown seeds. The fruit can be eaten; it has a slightly sour and rather nice taste.

FERONIA ELEPHANTUM (*Rutaceæ* or *Aurantiaceæ*)

Tamil, Velân—*Telugu*, Velaga, parupu velaga
English, Woodapple

A commoner and generally a larger tree than *Ægle marmelos* (see the remarks about that tree). I have seen it just under 9 feet in girth. The bark is dark-brown or black, rough or very rough, longitudinally cracked or channelled (sometimes deeply); it often falls, leaving light-yellow or white patches, is extremely hard and exudes a transparent gum.

The **leaf** is unequally pinnate and there are generally 2 or 3 opposite pairs of smooth, shiny leaflets. The common-petiole is usually winged, that is, has a narrow margin of blade running along each side of it. The leaflets may be an inch or so long and are more or less obovate and slightly emarginate and taper finely towards the stalk-end. As in the bael, the alternate leaves tend to grow in

groups of two or three. They smell of paregoric when crushed.

The **flowers** grow in small, axillary clusters an inch or two long and the combination of these clusters resembles a terminal panicle. The calyx is very small and 5-toothed. There are 5 petals, about a quarter of an inch long; these are greenish with a slight touch of red outside. There are generally 10 stamens and the most conspicuous thing about the flower is the large, oblong anthers on short, slender filaments. These anthers turn to a dull crimson before they become golden with pollen. The flowers are either male or bisexual and they have something of the peculiar smell of the leaves.

The **berry** is round and large (2 or 3 inches in diameter). It is rough and has a hoary look, being green mottled with white in colour. The rind is woody and very hard. The enclosed pulp, which contains numerous small seeds, changes from white to dirty-yellow and then to brown as the fruit ripens and the ripe flesh has a sweet but rather sickening smell.

Drury observes that the pulp "affords a very pleasant jelly closely resembling black-currant jelly only more astringent." I tried it but once long ago when a native gentleman asked C. and me to *chota haziri*. The refreshments consisted of coffee and woodapple jam and nothing else. One of us drank the coffee out of a tumbler and the other out of a brass chembu. There was fortunately only one pot of jam and C. and I felt bound in polite-

ness to finish the pot. I have felt sick ever since. I do not know what fact or fancy gave rise to the curious specific name.

Murraya (or *Bergera*) Kœnigii (*Rutaceæ* or *Aurantiaceæ*)

Tamil, Karivêppilai—*Telugu*, Karivêpa, Karivêpâku
English, Curry leaf tree

The leaf is much more familiar to us in curries than growing but the tree is pretty commonly seen. As a cultivated tree (I have never noticed it wild) it is very small and slender with a dark, smooth bark. The tips of the branches with their leaves being constantly cut for sale of the latter as a condiment, the tree seems to bear terminal tufts or crowns of leaves on its long, upright, slender branches.

The **leaf** is unequally pinnate and there are generally 8 leaflets (alternate or sub-opposite) on each side of the common-petiole. These side-leaflets are narrowly-ovate-lanceolate or oblong-lanceolate and have oblique bases. The terminal leaflet often approaches the rotundate form but is more or less pointed. When rubbed the leaves have a curious odour; Drury describes it as a "pleasant aromatic smell" but that is a matter of taste.

The **flower** grows in corymbose panicles. It has a small, green calyx and 5 slender, white petals. The stamens are black-headed.

The **fruit** is a small, one-seeded berry, black when ripe and tasting unpleasantly like the smell of ivy.

AILANTHUS EXCELSA (*Simarubaceæ* or *Xanthoxylaceæ*)

Tamil, Pîmaram, Perumaram

Telugu, Peddamânu, Peddavêpa, Goulivêpa

A common tree and an exceedingly conspicuous one, from which fact, I suppose, it derives some of its vernacular names, for it is usually hardly justifies the name of "big tree." The biggest I have measured was a little over 14 feet in girth and it sometimes grows very tall with huge, broadly-spreading boughs but it is much more common as a small tree than as a big one. The bark is brownish-gray, smooth or narrowly cracked and somewhat rough. This is one of the four trees with whorled branches which one commonly meets with. There is *Terminalia catappa* with a simple leaf, this tree with a pinnate leaf and *Eriodendron anfractuosum* and *Bombax malabaricum* with digitate leaves. Any whorled tree is almost sure to be one of these.

In Ailanthus there are sometimes 7 branches in a whorl and the whorling is usually very obvious, though in old specimens it is sometimes obscured. The growth of the tree is otherwise peculiar. The boughs tend to run out horizontally and then to curve into a vertical position giving the tree a candelabrum-like look. In young trees the greenish branches are few and the trunk straight and slender and, as the foliage is commonly very sparse and collected into crowns at the ends of the branches, the tree is too conspicuously unlike most other trees

not to attract attention. The wood is said to stink when wetted and hence one of the Tamil names.

The **leaves** are enormous, a yard or more long, the common-petiole being downy. The leaflets may number about a dozen pairs and are sub-opposite, downy beneath, up to about 8 by 3 inches (including a stalk of about 2 inches), unequal-sided, lanceolate and deeply but irregularly serrate.

The **flowers** grow in wide-branching, stiff, axillary panicles which may be 2 feet or so in length. The flowers are minute, very numerous and either bisexual or unisexual. There are a little, toothed, green calyx and 5 small green petajs. The male flower has 10 stamens with disproportionately large, deeply-wrinkled, twisted anthers of a yellowish or brownish colour.

The **fruit** is a samara; a membranous body, thin as paper, yellowish when ripe, pointed towards both ends, containing one seed and running to about 3 inches long by two-thirds of an inch broad.

PROTIUM (or *Balsamodendron*) CAUDATUM
(*Burseraceæ*)

Tamil, Kiḷuvai, Senkiḷuvai, Mallam kiḷuvai, Mâm kiḷuvai, Veḷḷai kiḷuvai—*Telugu*, Meṭṭa Mâmiḍi, Koṇḍa Mâmiḍi, Pulsara, Koṇḍamukkaḍi.

I am not sure whether, in giving the above Tamil names, I have mixed up two distinct species or whether they relate to mere varieties. Two varieties there certainly seem to be, for in the case of one

tree the leaves are fragrant and show little, if any, red colour about them, while in the case of another tree, identical to appearance, the leaves have no fragrance and are noticeably picked out with red. In the following description I have, like Mr. Pott's critic, "combined the information" I have gathered from my observation of both trees.

P. caudatum is common enough and especially, I think, on low ghats. It is readily identified by its dark-green, smooth trunk which is often covered by a thin, silvery skin which sloughs off in a brown scurf. The inner bark is pink.

The **leaves** are unequally pinnate and generally consist of 3 to 7 leaflets on a slender common-petiole and short petiolules. The leaflets are smooth, glossy and generally have long tails or points. They are a couple of inches or so in length and vary a good deal in shape, being lanceolate or elliptic or rotundate or obovate or broad-ovate-lanceolate, so that they run through most of the gamut of forms. When very young the leaflets are often reddish, later they are light-green and are frequently prettily veined with red on the under surface and have reddish stalks. Sometimes there is a pink blush over the whole under-surface. The bruised leaves often have a smell somewhat like that of the mango fruit whence some of the vernacular names.

The **flowers** grow in bunches of slender-stalked, stiff, dichotomous (double-branched), compound cymes some 5 or 6 inches long; the common-peduncle is often red. At the base of each fork of the panicle

there is normally a pair of small, pointed bracts. The flowers are very small and unisexual. The male flower is distinguishable by the fact that the 8 alternately shorter stamens project beyond the calyx whereas in the female they are concealed. The green or reddish calyx-tube is 4-toothed and there are 4 narrow, erect petals which are green or yellowish with a touch of pink or red and form a sort of tube with the tips joined or rolled outwards and downwards. The corolla ends by going almost black.

The **fruit** is a small drupe, half-an-inch or less in length, oval in shape, but somewhat flattened; the flesh containing a sticky juice with a resinous smell. It turns reddish-yellow when ripe.

AZADIRACHTA INDICA (or *Melia indica* or *Melia azadirachta*) (*Meliaceæ*)

Tamil, Vêmbu, Vêppa
Telugu, Yêpa, Vêpa Vyâpa, Nimbamu
English, Margosa or (Hindustani), Neem

One of the commonest trees of the country, so common that I should hesitate to describe it were it not that a friend of mine reached the rank of Acting Collector without knowing the tree. Common as it is, it is very rarely seen in the jungles. I remember to have noticed it only twice growing apparently wild and in one case there was a road avenue near from which seed may have been carried while the other place may have been a deserted village-site. The only good thing which that accursed weed, the

prickly-pear, does is to protect the seedlings of this useful and pretty tree, particularly delightful when it puts out in the hot weather its bright-green young leaves.

It is generally a moderate-sized tree with brown, rough bark, cracked lengthwise. I have seen a tree which was 23½ feet in girth at one foot from the ground and nearly 21 feet at 5 feet but that was a quite remarkable size and I have never seen anything approaching it. An average girth would perhaps be six feet or so.

The **leaves** are pinnate, clustering to the ends of the branchlets. The common-petiole is slender and about 10 or 11 inches long; the petiolules are very short. There are generally 6 or 7 opposite or subopposite or alternate pairs of leaflets; the terminal leaflet, if present, is small. The leaflets run to 3 or 4 inches in length and are very tapering, serrated, markedly unequal-sided and slightly curved into a sickle-shape (falcate).

The **flowers** are in slender-stalked, axillary panicles clustered at the ends of the branchlets. The panicles run to about 9 inches long. The calyx is very small, green, 5-lobed. The petals are 5 in number, white, narrow, with a spread of about half an inch. The 10 stamens form an erect tube encasing the pistil.

The **fruit** is a drupe, a smooth ellipsoid about two-thirds of an inch long. Both Drury and Brandis commit themselves to the strange statement that the ripe fruit is purple. It is hardly necessary to

say that the fruit of the margosa as known to us in the south is invariably yellow when ripe. It contains a shelly stone holding one large seed.

SWIETENIA MAHAGONI (*Meliaceæ*)

Tamil, Sîma Nûkku—*English*, Mahogany (Foreign)

Generally seen as a small or moderate-sized tree in this part of the world but occasionally large. The biggest specimens I have seen are on Alagar Hill near Madura but I cannot feel sure now whether those were not *S. macrophylla*.

The bark may be grayish and smooth or brown and rather broken; it is very hard in the older trees. When sliced it is reddish brown or chocolate-coloured, and, if cut right through, there is an appearance of bleeding as in the case of *Pterocarpus indicus*. In a big specimen of some 12 feet in girth the bark was broken into great flakes. The boughs are rather drooping.

The **leaves** are abruptly pinnate, alternate, growing at various angles round the branchlets. The common-petiole is slender and up to about 5 inches long. There are usually 3 or 4 pairs of opposite leaflets on petiolules about a quarter of an inch long; they are dull, dark, very unequal-sided, ovate-lanceolate with one side flattened, slightly acuminate and in size up to about 3 inches by 1 inch; the humping of one side gives the leaflets a falcate (sickle-shaped) look.

The **flowers** are in slender, lax, branching cymes, about 3 inches long, growing from the new shoots. They have a spread of about a quarter of an inch, a very small, truncated calyx and 4 to 6 greenish-white petals. The middle is occupied by a short, white, cylindrical staminal-tube inside which will be found the 10 little, dark anthers. There is a short, whitish pistil growing out of a ruby-coloured receptacle.

The **fruit** which grows on a thick stalk is a 5-lobed capsule, roughly ovoid, in length up to about $4\frac{1}{2}$ inches with a short circumference of 10 inches. In colour it is a chocolate, or, rather, rusty brown. Each cell of the capsule contains a number of curiously-shaped seeds packed one on another. The seed is flat and about three-quarters of an inch long; attached to one side of it is a membranous wing, an inch or so long, making the whole seed about 2 inches in length. This wing, in the case of the unripe seed, has a remarkably pretty, "frosted" look; later it turns to a cedar-brown. The axis of the capsule is thick, fleshy and orange or salmon coloured.

Another very similar foreign *Swietenia* which may be seen in Madras is *macrophylla*. This has a rather lighter-coloured bark which breaks and peels off. There is the same show of crimson blood vessels when the bark is cut. The tree can be readily distinguished from *mahagoni* by the noticeably greater size of petiole, leaflet and **fruit**. The last, except as to size, is exactly like the capsule of mahogany. In colour it is earth-brown, and rustier in hue than the fruit of

mahogany but this difference in colour which I have noticed may be a mere accident. In size it runs to about 5¼ inches long by 11½ round. The seeds are of the same shape and colour as those of mahogany but reach 3½ inches in length inclusive of the wing which is over an inch in breadth. The very thick axis of the fruit is marbled with crimson and salmon.

The **flowers** of macrophylla grow in rather lax compound cymes which appear in the leaf-axils on the young shoots and run to about 6 inches long. The flower is about one-third of an inch in spread, is fragrant, has a short calyx-tube, 4 or 5 (or, presumably, 6) concave, obovate, pale-green petals and a truncated, conical staminal-tube in the middle; this encloses a ruby-red disk. In fact the flower is practically identical with that of mahogany but a trifle larger.

CHLOROXYLON SWIETENIA (*Meliaceæ* or *Cedrelaceæ*)

Tamil, Porasu—*Telugu*, Billu, billudu

English, Satinwood

The bark is light-brown or grayish and is generally rough, being either ridgy or broken into scales and patchy. It is soft and yellow-ochre in colour underneath.

Commonly the tree is small and rather starved-looking, but it may be found as a tall, fine tree with a girth of over 6 feet.

The **foliage** has a pretty, airy look. The leaves which grow all round the branchlets are abruptly

pinnate and have a slender common-petiole which may be 10 inches or so in length.

The leaflets may number 15 pairs or more ; they are sub-opposite or alternate, on short petiolules, very unequal-sided, oblong, an inch or so in length, dull, light-green above, paler below.

The **flowers** are small and grow in spreading panicles (compound cymes is, perhaps, more correct) with whitish-green stalks. The small calyx-tube has 5 teeth and is whitish-green. The 5 petals bend downwards and are white in colour and clawed. The 10 stamens are white and arranged in a double series on a white disk surrounding the green ovary.

The **fruit** is a narrow-ellipsoidal capsule, rather over an inch long by about half as broad. Depressed lines running lengthwise divide it into 3 (occasionally 4) valves to each of which adheres a dissepiment against which are packed the seeds. These have a long, narrow wing at one side and run to about three-quarters of an inch long. The capsule turns yellowish and then light-brown when the seeds also assume that colour.

SAPINDUS EMARGINATUS (or *laurifolius* or *trifoliatus*) (*Sapindaceæ*)

Tamil, Pûṇḍi, Pûvaṇḍi, Pûchikây, Ponnângoṭṭai
Telugu, Kunkuḍu, kûṭi, kukuṭi
English, Soapnut

A moderate-sized tree and fairly common. It is most easily recognized by the roughness and

lumpiness of its light-brown bark and often by the deep notch at the end of each leaflet.

The number of **leaflets** varies considerably up to 3 pairs. It is a distinguishing characteristic of the tree that the terminal pair of leaflets is markedly the largest. The leaflets bear on the under surface of the veins a soft, brownish down and the same down is found on the leaf-stalks and small twigs. The common-petiole runs to about 4 inches; the petiolules are very short. I have seen a leaflet 10 inches long by nearly 5 broad but usually they run to about half that length and breadth. They are elliptic or very slightly obovate; may be rounded at the end or else slightly or deeply emarginate and are dull-green in colour with well-marked veins.

The **flower** which is either male or bi-sexual is very small, growing in branching, terminal panicles. There are 5 green, concave sepals, 4 or 5 white, woolly, clawed petals and 8 or fewer woolly stamens. The petals never seem to open properly; at least I have always found them closed towards the tips.

The **fruit** is a drupe, in size between a pea and a cherry, roughly globular, dull green with a rusty pubescence. Normally the fruits grow in threes united at one point of their surfaces but one or two members of the group are often partially suppressed. When dry the fruit is light-green or reddish and has a waxy look. The stone is black and extremely hard. The tree is often swarming with large, foul-smelling bugs of sorts.

Odina wodier (*Anacardiaceæ*)

Tamil, Udiyan, Odiyan (giving the specific name to the tree)—*Telugu*, Gumpena, dampâri

This common tree bears a general resemblance to the margosa but it can be distinguished readily by the light colour of the trunk and the fact that the margins of its leaves are not serrated.

It attains a good size with a girth of 9 or 10 feet. The trunk is smooth and sometimes so light in colour as to be almost quite white; the under-bark is dark-red. The tree is rather like an English ash.

The **leaves** are unequally pinnate with a common-petiole which may be a foot or more long. There are generally about 7 pairs of lateral leaflets which are opposite, ovate-lanceolate or elliptic-lanceolate, acuminate and almost sessile.

The **flowers** grow, almost sessile and in little clusters, along slender, lax, green stalks running to 2 feet or so in length and clustering at the ends of the branchlets. These spike-like racemes may be branched or simple and they are so abundant as to form a sort of spurious foliage when the tree is leafless. The buds seem to open very slowly. The flowers are very small. The calyx which is often tinged with dull-red is barely discernible. There are 4 or 5 green or greenish-yellow, down-curved petals and 8 to 10 stamens which are pretty conspicuous in the male flower. The female flower is distinguished by a stout pistil with 4 short styles. Normally the female flowers

grow on a simple rhachis which is under half-a-foot in length but occasionally one finds a few fruits on a much longer rhachis which makes me think that female flowers sometimes grow on the same rhachis as the male. The general rule is: female flowers on a short, simple stalk and male flowers on a long, simple or branched stalk.

The **fruit** is a drupe about half-an-inch long, somewhat flattened and slightly kidney-shaped and bears at the end the marks of the styles. It turns red when ripe.

SPONDIAS MANGIFERA (*Anacardiaceæ*)

Tamil, Marimângai, Kâṭṭumâ—*Telugu*, Aḍavimâmiḍi, Amati—*English*, Hog plum

This tree is said to be widely distributed and to be common in some places. It is also said to grow large but I have not seen it so. The bark is smooth, soft and very thick, outside it is gray, inwardly of a reddish-brown colour; Brandis says that it is aromatic but I have not found it to be so. The boughs are brittle.

The **leaves** tend to cluster to the ends of the branchlets. They are unequally pinnate and may measure from the base to the tip of the terminal leaflet about 16 inches. The leaflets are in 3 to 5 opposite pairs, run to 5 inches or so in length and are oblong in shape and acuminate. The ends of the lateral veins are joined by a fairly well-marked intramarginal nerve.

The **flowers** which are unisexual or bisexual appear when the tree is leafless and form conspicuous, stiff, terminal panicles. They are almost sessile and grow, abundantly, in clusters along, or upon short sub-branches rising from, the long, horizontal branches of the panicles, the whole inflorescence attaining a length of a foot or so. The calyx-tube is very small, white, 5-toothed. There are 5 white, down-curving petals with a spread of about one-fifth of an inch. The stamens are short and yellowish and grow round a disk.

The **fruit** is an ellipsoidal drupe, which is said to turn yellow when ripe and runs to about 2 inches long. It is eaten as a pickle.

SESBANIA (or *Æschynomene* or *Agati*) GRANDIFLORA
(*Leguminosæ—Papilionaceæ*)

Tamil, Agatti—*Telugu*, Avisi, agisi, tella avisi

A small, smooth and very slender tree cultivated extensively as a support to betel vines and for its leaves which are eaten as a vegetable and given to cattle. Drury says that it attains a height of 35 feet but that must be rare—generally it is not more than about half that height. The branches are few, short and slender and the bole is long.

The **leaf** is abruptly pinnate and up to about a foot long. There are generally about 20 pairs of leaflets which are oblong, an inch or so in length, and opposite or sub-opposite and have very short petiolules.

The **flower** is conspicuous. It is nearly always white but there is a handsome variety (Sevappagatti in Tamil) which is crimson. It looks curiously like a huge comma and is of the ordinary papilionaceous type, with standard, wings and keel. The standard in the white variety is pinkish-yellow and the other petals are white. The curved keel which has very long claws projects (following the curve) about 5 inches beyond the short, green, two-lipped (or entire), membranous calyx. The stamens are very long and curved, one free and nine bundled together to enclose the long style. The flowers grow, generally 3 or 4 in number, on a short raceme.

The **legume** grows to about a foot in length, is very slender and constricted in places and tapers at both ends. The principal peculiarity is that it is square in section. It is light-brown in colour when ripe.

SESBANIA ÆGYPTIACA (or *Æschynomene sesban*)

(*Leguminosæ—Papilionaceæ*)

Tamil, Sittagatti, semban
Telugu, Lingachima, Jîluga
(Foreign?)

A small, smooth, gray tree closely resembling *S. grandiflora*, but generally smaller and perhaps a bit more branchy. I have seen it up to about 20 feet in height and with a trunk girth of a couple of feet or so. It is cultivated but not, I believe, for human food.

As compared with *S. grandiflora* the **leaves** have shorter common-petioles and the leaflets are smaller.

The **flower** is quite unlike that of the other species. It is said to open in the evening and is certainly in general found shut, the dark standard enfolding everything. The flowers are small and grow, half a dozen or so together, in lax, axillary racemes. The standard is externally of so dark a purple as to be almost black; so is the heel. Inside the standard is partially crimson; the wings are crimson and orange.

The **pod**, which becomes light-brown, is 6 or 7 inches long, very slender and slightly twisted.

There is a variety of this tree which has a plain yellow flower.

DALBERGIA SISSOO (*Leguminosæ—Papilionaceæ*)

Tamil, Sîsam, Sissu, Gette—*Telugu*, Sissu

This tree is pretty common in some places, for example in the 'paḍugai' lands along the Kâvêri. It is said to grow big but is commonly a rather small tree. I have seen it with a girth of nearly 8 feet and a height of about 50 feet. It has a certain resemblance to a birch. The bark is brown or light-brown, hard, rather rough or cracked and scaly.

The **foliage** is peculiar and serves to identify the tree. The leaf is unequally pinnate. The common-petiole is 3 or 4 inches long and remarkable because of (1) its slenderness and (2) the fact that it zigzags

from leaflet to leaflet. There are generally 3 or 4 lateral leaflets and a terminal which is the largest. The leaflets are sometimes broader than long; or they are orbicular, rotundate, broadly obovate or broadly elliptic; they have wavy margins and a sudden, short acumen, looking out of place on a leaf of such a shape but serving the useful purpose of at once distinguishing this tree from *D. latifolia*. The petiolules are short and the blade is rarely so much as 3 inches long.

The **flowers** grow in short, branching panicles which are generally axillary. The blossoms are practically sessile, inconspicuous, about one-third of an inch long. The green calyx-tube is about one-quarter of an inch long and there are 5 light-yellow petals of the type usual among papilionaceous plants.

The **fruit** is indehiscent (i.e., does not open naturally). It is 2 or 3 inches long, thin as paper, narrow, pointed at the ends, broadened unequally in the middle where are one or more flat seeds.

DALBERGIA LATIFOLIA (*Leguminosæ—Papilionaceæ*)

Tamil, Tôḍâgatti, Eruvaḍi, Itti

Telugu, Ittigi, Chittage, Iruguḍu, Iruvuḍu, Ibbaḍi

English, Rosewood, Blackwood

Rare outside jungles I think and, though it grows big, my notes are made from small or moderate-sized specimens.

Bark brown and, in young specimens, smooth, in bigger trees cracked and rough.

An unequally pinnate **leaf** with a common-petiole running to about 9 inches. The leaflets are generally not more than 7 in number, short stalked, alternate or sub-opposite; orbicular, or broadly ovate or obovate; blunt-ended or emarginate; up to 3½ inches long, dull, smooth.

The **flower** is small but rather pretty. It grows in stiff, but slender, axillary panicles which may be 3 or 4 inches long and is about a quarter of an inch in length. The calyx-tube is white and has 5 teeth. The corolla is pale-yellow, the petals being all about the same length and concealing the 9 stamens.

The **pod** is broader than that of *D. sissoo*, being about 2 inches long and nearly 1 inch wide in the middle where it is unequally broadened; it is pointed at the ends, flat, papery, brown when ripe and contains one or more flat seeds.

PTEROCARPUS INDICUS (*Leguminosæ—Papilionaceæ*)
Tamil, Vêngai

A fine, large tree with smooth, brown bark. One characteristic which it shares with *P. marsupium*, though it is less marked in this species, is the apparent bleeding which takes place when the bark is cut through.

In **foliage** it rather resembles *Pongamia glabra* but the leaflets are alternate or sub-opposite, whereas in *Pongamia* they are opposite; they are also more numerous, smaller and the common-petiole is longer than in the case of *Pongamia*.

The leaf is unequally pinnate and the slender common-petiole runs to a foot or so in length. There may be as many as 16 leaflets which are elliptic (often forming a perfect oval) or somewhat ovate and slightly acuminate, the acumen being blunt and slightly notched. The petiolules are very short. The leaflets grow to about 5 by $2\frac{3}{4}$ inches, are glossy and perfectly smooth on both sides and have wavy margins.

The **flowers** are fragrant and grow in axillary racemes or irregularly branched panicles. The pedicels are slender, curving, about half an inch long. The green, toothed calyx-tube is about a quarter of an inch long. The corolla is of a rather deep yellow, the standard, which is much the largest petal, being half an inch or so long and nearly as broad. The stamens and pistil are concealed in the keel.

The **fruit** (a samara) is a flat disk about $1\frac{1}{2}$ inches in diameter, the centre swollen and containing the seed. When ripe the fruit is brown and the circular rim is papery.

PTEROCARPUS MARSUPIUM (*Leguminosæ—Papilionaceæ*)

Tamil, Udirai Vêngai
Telugu, Peddêgi, Êgisa, Êgi

A large tree with light-brown or somewhat gray bark which is sometimes cracked and rough. From most trees it can be readily distinguished (hence

the Tamil name) by a very realistic show of bleeding when the bark is cut through.

The leaflets are easily distinguished.

(1) From those of *P. indicus* because they are emarginate and sometimes deeply so;

(2) from those of *Pongamia glabra* by the same fact and because they are alternate.

The **leaf** is unequally pinnate with a common-petiole running to about 6 inches long. There are commonly 5 or 6 leaflets which are glossy and pretty; the petiolule is short (up to about half an inch); the blade is elliptic or oblong, square-ended and up to about 5 by a little over 2 inches and has wavy edges.

I have not seen the **flower** which Brandis describes thus: "Yellow or white, pedicels much shorter than calyx, in terminal panicles. Calyx, peduncles and pedicels clothed with dark brown hairs."

The **fruit** is just like that of *P. indicus*.

PONGAMIA GLABRA (*Leguminosæ—Papilionaceæ*)

Tamil, Pungan—*Telugu*, Kânuga

A very common tree with a general resemblance to a beech. It is of moderate size, the largest I have measured having a girth of 7 feet. The trunk is grayish or hoary; the bark in old trees somewhat cracked and broken, but generally smooth.

The **leaves** when young are of a particularly soft and pleasing green. They are unequally pinnate, the terminal leaflet being the longest. Generally there are

3 opposite pairs of lateral leaflets. The leaflets are ovate-lanceolate or elliptic, slightly acuminate, shiny and up to about 4½ by 3 inches. The common-petioles which are green and slender run to about 7 inches; the petiolules are short.

The **flowers** grow in axillary racemes which grow to 8 or 9 inches in length. The blossom is about half-an-inch long. The calyx is cup-shaped and brown in colour. The 5 petals which open but slightly are white with a slight tinge of lilac or pink, the standard being much the largest. The 10 white stamens form a little column in the middle.

The **pod** grows to about 2 inches long and 1 inch broad. It goes brown, contains 1 or 2 large seeds and is slightly beaked.

PARKINSONIA ACULEATA

See under Bipinnate leaves

TAMARINDUS INDICA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Puḷi—*Telugu*, Chinta—*English*, Tamarind

This is too common a tree to need any description. Every one knows it but not every one notices how pretty the **flower** is. It grows in racemes; the bud is pink, the 4 calyx-lobes are yellow and thrown backward, the 3 petals are delicately veined with red and two of them strain back like wings spread for flight. The pistil turns away in a very marked manner from the 3 developed stamens. I do not know what it is about this tree which makes its

shade so "hot," as the natives say, but certainly of all trees professing to cast a shade the tamarind performs its task most churlishly.

The finest tamarind I ever saw stands, if I remember right, by the road from Nellore to Râpur; a splendid tree, stout and shapely and sound of heart with a girth of some 26 feet. In mere girth this tree was excelled by one which taped over 30 feet but that was a misshapen creature which formed an appropriate residence for Karuppana Swâmi. A ryot told me that he had several times seen that deity strolling about by the tree.

There are three Cassias, of which two are very common and the third (Roxburghii) common in certain places. In foliage and, still more, in their inflorescence they are unlike and therefore there is no difficulty in distinguishing them. As regards foliage the difference between them may be roughly described as follows:—

The leaves of *C. Roxburghii* are set on in the same plane, the young leaves are conspicuously lighter-coloured than the old and often, especially in garden specimens, the branchlets are long and sweeping, the result being a pretty tree with a rather ferny look about the foliage. *C. florida* has stiff branchlets with leaves projecting at all angles. *C. fistula* has very much larger leaflets than the other two and, instead of being oblong with blunt ends, they are ovate and often pointed.

CASSIA FLORIDA (or *Siamea*) (*Leguminosæ—Cæsalpinieæ*)

Tamil, Manjakonnai, Karunkonnai

Telugu, Sîmatangêḍu

A small or moderate-sized tree with gray or whitish and nearly smooth bark.

The **leaf** is abruptly pinnate with, sometimes, as many as 12 pairs of leaflets but commonly fewer. The leaflets are shiny, oblong or narrowly elliptic, mucronate and occasionally slightly emarginate. Generally the leaflets are an inch or so long but sometimes exceed 2 inches.

The **flowers** are very conspicuous, growing in axillary, corymbose racemes grouped to form a sort of stiff, terminal panicle which may be a yard or so long. In colour they are yellow and in size an inch or more across. There is a small greenish calyx and, of the 5 clawed petals, 2 are often somewhat larger and noticeably more concave than the rest. The 7 developed stamens bear large, brown anthers and 2 of the stamens are much longer than the rest and as long as the pistil. There are 3 undeveloped stamens. At the base of the pedicel is a small, curving, long-pointed bract.

The **fruit** is a legume, flat, up to about 10 inches long by half an inch broad, ending in a point, with thickened edges, the seeds prominent; the colour of the pod is green to purplish. The young pods are soft and ribbony.

CASSIA FISTULA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Sarakonnai—*Telugu*, Konai, rêla, kakka
English, Indian laburnum

Books sometimes speak of this tree as the "pudding pipe tree" but I never heard any one use this ridiculous name.

It is a beautiful sight when covered with the golden, laburnum-like flowers. Usually it is small, gray and smooth but in old specimens the bark is rather broken. There is a remarkably fine one in the compound of the "Hotel Spencer", Madras. This is nearly 7 feet in girth.

The abruptly pinnate **leaf** is a foot or less in length with leaflets up to six pairs in number. The leaflets are smooth, ovate or ovate-lanceolate, short-stalked and very large—up to 6 by over 3 inches.

The scented **flowers** grow in large, beautiful, hanging racemes which may be over 2 feet in length, the pedicels running to about two inches long. The 5 sepals are green ; the 5 elliptic, concave petals are an inch or more in length, pale yellow. There are a long, curved, green pistil, 3 long, curved stamens and 7 shorter ones of varying lengths. The pistil and long stamens are nearly 2 inches in length.

The pointed **pod** is cylindrical and turns black. I have seen it nearly $2\frac{1}{2}$ feet long and it is sometimes over 3 inches round and resembles a ruler as much as anything. The pod is divided into numerous one-seeded cells by transverse partitions. These cells

are about a quarter of an inch deep and are filled with a white substance which later becomes black and sticky in which state it has a strong and rather nauseating smell.

CASSIA ROXBURGHII (or *marginata*)

(*Leguminosæ—Cæsalpinieæ*)

Tamil, Senkonnai—*Telugu*, Sîmarêla

Drury rightly remarks that this tree is rarely found in a wild state but it is common, wild, in the jungly country marching the Trichinopoly and Madura Districts. It is often seen in Madras in gardens of which it forms a conspicuous ornament with its pretty foliage and long, sweeping, frond-like branchlets. Usually it is small with dark brown, cracked or rough bark.

The **leaves** when young have small, curved stipules; they are abruptly pinnate and run to 10 inches or so long. The leaflets are opposite or sub-opposite, commonly numbering about 12 pairs but sometimes as many as 19 or 20; they are small (up to an inch or so long), dull, oblong, mucronate, somewhat unequal-sided, sometimes slightly emarginate.

The **flowers** grow in axillary racemes and have a scent rather like the hawthorn. They are pink, or, when fading, orange, in colour. The excessive development of three of the stamens and the smallness of one of the petals will be noticed.

The cylindrical, black **legumes** (green or reddish when young) run to 15 or 16 inches long; they

contain brown seeds in cases like gun-wads separated by transverse partitions.

Cassia nodosa which is occasionally seen in gardens has a flower like that of *C. Roxburghii* but the two trees can be easily distinguished by the leaves and fruits.

Hæmatoxylon campechianum

(*Leguminosæ—Cæsalpinieæ*)

Tamil, Aḷavannan (a misnomer I believe)

English, Logwood

(Foreign)

A small tree with rough, grayish-brown bark. Gamble says that the trunk is much buttressed and indented. In the axil of each leaf is a sharp thorn and the branchlets are often spinescent.

The **leaf** is abruptly pinnate. The slender common petiole runs to 2 inches or so in length and bears usually 3 or 4 pairs of almost sessile leaflets. These are obovate with squared, slightly indented ends and run to nearly an inch long by over half an inch broad; somehow or other the leaflets look remarkably small and thus serve to identify the tree.

The **flowers** grow in spike-like, lax racemes about 3 inches long. They are very small and fragrant. The calyx is green; the petals yellow; the stamens protrude and have dark anthers.

The **fruit** is a flat, papery legume running to about 2 inches in length by less than half an inch in breadth, tapering at both ends. The seeds,

usually two, are very small. The pod is said to burst irregularly along the sides instead of at the edges. It turns brownish-white.

Tecoma stans (*Bignoniaceæ*)

Tamil, Suvarnapaṭṭi ; habitually called Tangarali or Ponarali in Madura but that name really denotes *Thevetia neriifolia.*

(Foreign)

One of the commonest plants in gardens and recognizable by its masses of bright-yellow, trumpet-shaped flowers. It is not to be confused with *Thevetia neriifolia* which is at once distinguished by its grass-blade-like leaf. *Tecoma stans* is nearly always a mere shrub but occasionally it is a very slender tree growing to perhaps 15 feet in height.

The **leaves** are opposite, decussate and unequally pinnate. The common-petiole may be about 6 inches long. There are generally 2 or 3 pairs of opposite, sessile leaflets, the terminal which is the largest running to 4 or 5 inches in length. The leaflets are lanceolate with serrated edges.

The **flowers** grow in terminal racemes on short pedicels. There is a small, 5-toothed calyx and a 5-lobed corolla-tube which may be about 2 inches long with a spread of an inch and-a-half or so. There are 4 developed stamens with double heads.

The **fruit** is a capsule, the two narrow valves (up to about 9 inches long) separating and revealing a

long, narrow partition (dissepiment) to which the seeds are attached.

KIGELIA PINNATA (*Bignoniaceæ*)

Tamil, Marasorakáy

(Foriegn)

This is becoming quite a common tree. There is a fine specimen in the Agri-Horticultural Gardens, Madras, with a girth of 12 feet or more and a shade-diameter of about 40 yards. The tree has a grayish-brown or brown bark which is often rough. The tree is easily recognized on account of the big, pendulous fruits which seem to be generally on view.

The **leaves** are unequally pinnate and grow in whorls at the ends of the branchlets. The common-petiole runs to about a foot and a half in length. The leaflets may number 3 to 5 pairs with a terminal and in size they go to about 8 by 4 inches; sessile or almost so, the blade being cut away on one side near the base; very harsh and stiff; light-green or a sort of olive-green; ovate, elliptic or oblong; blunt or somewhat squared at the apex.

The **flowers** grow in immensely long, pendulous panicles of which the stalks may run to 6 feet, the flower-bearing portion being a third or so of this. The branches of the inflorescence may be in whorls of 3 or 4 and may be simple or divided into sub-branches. These branches or sub-branches are directed forward and then curved so as to hold the flowers mouth-upward. The blossoms are of great size with

a spread of 6 inches or so. The calyx is a large, 5-toothed, greenish cup. The corolla-tube is outwardly streaked with yellow or pale-green but inside it is a sort of deep crimson or maroon colour with a slight brownish tinge ; the tube opens into a gaping mouth with 5 large, crinkled lobes, of which two are prolonged and less deeply severed from each other than are the lobes generally. There are 4 long, crimson stamens with large, yellow, double-headed anthers; the fifth stamen is more or less aborted; there is a long, whitish pistil.

The **fruit** is a huge, sausage-shaped berry, up to 1½ feet long by 3 inches or more in diameter, gray in colour, of woody texture and containing seeds like orange-pips.

Dolichandrone (or *Spathodea*) arcuata (*Bignoniaceæ*)

Tamil, Ranpâlai

A garden tree of moderate size with smooth, gray bark going black on the branches.

The **leaves** are unequally pinnate, opposite, decussate. The common-petioles about 6 inches long, slender, downy. The leaflets are on short petiolules, velvety, dull-green, commonly 5 in number (Brandis, however, says 9 to 11), ovate or elliptic with a short acumen. The lateral leaflets are more or less unequal-sided. The terminal leaflet is the largest and runs to about 4 inches by 3 inches or so.

The **flower** has 5 crinkly-edged corolla-lobes, the cleft between two of them being shallow. The slender corolla-tube runs to $3\frac{1}{2}$ inches long and its lobes have a spread of about 2 inches. It is white but turns to a very pale brown when dying. The calyx is green, spathaceous, breaking to one side, about 1 inch long. The flowers grow in short, terminal, few-flowered racemes, the peduncle being about $1\frac{1}{2}$ inches long.

The **fruit** I have not seen. Doubtless it is a long capsule resembling the capsules of other members of the genus.

Dolichandrone (or *Spathodea*) crispa
(*Bignoniaceae.*)

Tamil, Pumbâdri, Periya Udiya
Telugu, Nîroddi, Oddi.

To be seen in gardens. A smooth, grayish tree as seen by me and this is confirmed by Roxburgh but Gamble says that it has a thick, brown, rough bark. It is said to grow to a moderate size but I have seen it only as a small tree.

The **leaves** are unequally pinnate with a common-petiole of about 6 inches. There are generally 3 pairs of leaflets, opposite, on short petiolules. In colour the leaflets are light-green (often yellow); they run to about 4 by 2 inches, are ovate-lanceolate or oblong-lanceolate, slightly unequal-sided and smooth and bear long acumens or points.

The **flowers** are terminal in clusters of 3 or 4 or thereabouts. The spathaceous, green calyx is about 2 inches long and breaks away to one side. The corolla-tube may be 5 or 6 inches long, is slender for about two-thirds of its length and then enlarges. The upper part and the 5 crinkly, uneven-edged lobes are pure white. These lobes have a spread of 2 or 3 inches. There are the usual 5 (4 developed), large-anthered stamens in the mouth and the very long, slender, flat-stigmaed style reaches the mouth of the tube.

The **fruit** is a long curved, pointed, cylindrical capsule running to about 1½ feet long by less than an inch in diameter. These pods often grow in pairs. They are of a dirty-green colour with black speckles and finally turn to a dull, grayish brown. Two cross-partitions divide the capsule longitudinally into four chambers in which are packed innumerable seeds. Each seed is so spread out as to resemble a pair of seeds and it has a squarish wing on either side.

The length of the corolla-tube as measured by me is so much greater than the book-measurements that I feel some doubt as to the identification of this tree.

DOLICHANDRONE (or *Spathodea*) STIPULATA
(*Bignoniaceæ*)

(Foreign)

A garden tree which I have seen only as a small tree with a silvery, smooth bark.

The **leaves** are unequally pinnate, opposite, crowded at the ends of the branchlets. The common-petiole grows to about 10 inches in length and is downy as are the veins and the under surfaces of the leaflets; at the base is often a pair of small, stipule-like leaflets. The leaflets usually run to 9 in number. The petiolules are very short with swollen joints. The leaflets decrease in size from the terminal but the lateral leaflets, too, are often large. Samples of measurements are (terminal) 8 by 6 inches, $7\frac{3}{4}$ by $7\frac{1}{4}$, (lateral) 7 by $4\frac{1}{2}$, $4\frac{1}{2}$ by $3\frac{3}{4}$. They are gland-dotted and have wavy margins (Brandis says "sometimes serrulate").

The **flowers** grow in short, branching racemes which are thickly covered with a brownish down, The calyx may have 5 or fewer lobes and is about an inch long, brown, velvety. The corolla is about $2\frac{1}{2}$ inches long with a spread of about the same, furry outside, yellow and wide-mouthed; it has 5 rather crinkly lobes. There are 4 (developed) yellow, double-headed stamens, reaching to the orifice and lying against the longer side of the flower. Among the stamens is the green style with flat, spade-shaped stigma.

The **fruit**, growing out of the persistent calyx, is a capsule, bearing 10 ridges, about 18 inches long, curved and pointed like a buffalo's horn and sometimes rather twisted. It is cylindrical with a diameter of about three-quarters of an inch in the broadest part and bears scattered, brown hairs.

HETEROPHRAGMA ADENOPHYLLUM

(*Bignoniaceæ*)

Tamil, Kônamurukkan

(Foreign)

A tall, slender, garden tree with a smooth, light-brown bark.

The **leaves** are unequally pinnate, the common-petiole running to about 18 inches in length. Near the base are two small, ear-like leaflets and there are generally 3 pairs of large, coarse, lateral leaflets which are sessile and elliptic-lanceolate in shape. The terminal leaflet is the largest and may be about a foot long by about half as broad.

The **flowers** are in short, stiff, terminal panicles covered with a brownish down. The calyx-tube is an inch or so long, bell-shaped, downy, with 3 to 5 irregular lobes. The whole flower is about 3 inches long and has a spread of about 2½ inches. The corolla-tube is yellow but covered with brown down externally; its gaping mouth is fringed by 5 large, crinkled, lumpy-looking, greenish-yellow lobes. Four of the 5 stamens are large and bear brownish double anthers; they lie against the longer side of the tube and are longer than the flat-headed, green style which reaches to the mouth. The lower part of the pistil is covered with brown down and it grows out of an irregular, shiny disk.

The **fruit** is cylindrical, pointed, curving, slightly ridged, about 18 inches long and three-quarters of an inch in diameter, green with a yellowish down

and small, white dots. The seeds which are very numerous have a small transparent wing at each end, the whole being about three-quarters of an inch long by one-third of an inch broad and forming a (mathematical) oblong. By the flattening out of its halves, the seed, as in many of this family, looks as if it consisted of two seeds in close union.

Spathodea campanulata (*Bignoniaceæ*)

Tamil, Paḍavîya

(Foreign)

A tall tree with gray, smooth trunk, to be found in gardens in Madras and conspicuous by its bunches of large, red flowers.

The young **leaf** bears two large, leaf-like, axillary stipules (or rather, perhaps, stipule-like leaflets). The leaf is unequally pinnate with a green common-petiole which sometimes exceeds 2 feet in length. The petioles and branchlets have little, white lumps (lenticels) on them and the shoots are rather square.

The leaflets number up to 7 pairs with a terminal. They are smooth, glossy, opposite, on very short stalks, elliptic or oblong, generally with a short acumen, slightly unequal-sided, up to about 5 by $2\frac{1}{2}$ inches in the blade. There are lightish-coloured glands or lumps at the base of the leaf. The veins appear sunken on the upper surface.

The **flowers** grow in stiff, terminal, corymbose or pyramidal, many-flowered racemes. and are large and showy. The peduncles are an inch or two long

and bear 2 small bracts. The young flower, wrapped in the calyx, forms a comma-shaped bud filled with a watery fluid which spurts out when it is torn open. Later, the large, leathery calyx (about 2 inches long) is burst open at one side by the long, curved corolla-tube which opens widely into 5 lobes with indented margins. The corolla-tube is baggy at one side and measures 4 inches or so in length (following the curve) by about 2 inches in breadth. Inside the corolla is yellow or orange streaked with crimson, the lobes being red. There are 4 long, reddish stamens attached to the tube and a longer, yellowish style, terminating in two flat stigmatic lobes. The flower has a rather unpleasant, batty smell.

The **fruit** is a stiff, flattened capsule, sharply pointed at both ends. The capsules grow in a sort of spiky coronet and may be, say, 10 inches long by $1\frac{3}{4}$ inches across in the broadest part. In colour the fruit is dull green and it is commonly spotted with black, as a result possibly of some disease. The dry capsule turns light-brown. It contains a polished, lengthwise partition (dissepiment) on either side of which lie the innumerable, small seeds which are surrounded by a most delicate, silvery or somewhat iridescent, transparent, membranous wing which may be an inch long and over half an inch broad.

PHYLLANTHUS EMBLICA

See under Simple Leaves.

Bipinnate Leaves

BIPINNATE LEAVES

MELIA AZEDARACH (*Meliaceæ*)

Tamil, Malai vêmbu—*Telugu*, Turaka vêpa

English, Persian lilac

(Foreign)

Quite common as a cultivated tree. A decidedly smaller tree than the margosa to which it bears a general resemblance. It can, however, be distinguished at once by the fact that the leaf is bipinnate. It is a slender tree and has a smooth trunk, sometimes grayish-brown but usually dark; there are often reddish streaks down the bark which is reddish when sliced.

The **leaf** may be nearly 2 feet in length and ends with a terminal leaflet ; the pinnæ, which may number 8 or 9 opposite pairs, vary in length from 4 or 5 inches (including the long terminal) downwards and usually bear 4 or 5 pairs of leaflets. The leaflets are very variable in size, the terminals being commonly largest and running to somewhere about $2\frac{1}{2}$ inches long by three-quarters of an inch broad. The leaflets are serrated and lanceolate and taper to long points. The petiolules are short. The leaflets of the pinnæ often break up into sub-leaflets and the leaf then becomes tripinnate. In fact the leaf is in general partially tripinnate at the base, bipinnate in the middle and pinnate at the top.

The **flowers** grow in axillary panicles; the buds are lilac; the white petals are touched externally, near the tips, with lilac and this distinguishes the flower readily from that of the margosa. In the

middle is a conspicuous, violet or purple staminal tube. The flowers are small and fragrant.

The **drupe** is almost globular or broadly ellipsoidal or somewhat obovoid and runs to about two-thirds of an inch in length. It is smooth and, when ripe, yellow. The stone is very hard and ridged and may contain as many as 6 cells, each holding a small seed. On the other hand the stone of the margosa is easily cut through and it contains only one large seed.

CÆSALPINIA CORIARIA (*Leguminosæ—Cæsalpinieæ*)
Tamil, Sumikkikây, Kônakây, Kodichchita
Telugu, Divi-divi—*English*, Divi-divi
(Foreign)

This tree is pretty common, though generally found only in gardens. It is low-growing, spreading and very branchy, the boughs writhing and interlacing to a remarkable degree. A very large specimen had a girth of 7 feet but it never seems to exceed about 25 feet in height. The bark is brown and usually rough. The trunk is generally short and irregular in shape.

The **leaves** are bipinnate with slender common-petioles 3 or 4 inches long; the pinnæ (up to 9 pairs with, in addition, a terminal pinna) are opposite or sub-opposite and run to about 2 inches in length; the leaflets are very small, linear, about $\frac{1}{4}$ inch long and there may be 20 or 30 opposite pairs of them.

The **flowers** scent the air round the tree but are insignificant little things; they grow in short panicles, have a 5-lobed green calyx and 5 small yellowish-white or white petals, 10 yellow stamens (a quarter of an inch or so long) with red bases and a red style.

The **pod** goes brown in colour and runs to about 3 inches long by one inch broad but is commonly about 2 inches by nearly 1 inch. It is somewhat turgid and curiously shaped, forming half-circles, circles or double half-circles, in which last case it assumes, roughly, the form of an **S**.

PELTOPHORUM FERRUGINEUM (*Leguminosæ—Cæsalpinieæ*)

(Foreign)

A handsome tree at all times and beautiful when arrayed in its full vestment of golden flowers. It grows to a good size, 6 or 7 feet round and, for all I know, much more. The bark is smooth and gray or somewhat silvery; the inner bark has an orange tinge. It is sometimes slightly buttressed.

The **foliage** has a ferny look and the tree must not be confounded with *Parkia biglandulosa* or *Poinciana regia*. To distinguish it from *Parkia* it is enough to say that the latter has about 100 pairs of linear leaflets about a quarter of an inch long, while *Peltophorum* has about 20 pairs of oblong leaflets nearly an inch long. As to *Poinciana* it may be noted that it has about 40 pairs of leaflets about half the size of those of *Peltophorum* and a smooth, green common-petiole while *Peltophorum* has a rather sticky common-petiole which bears a brownish-green or rusty down.

Peltophorum may now be described in more detail.

The branchlets bear a fine, rusty down over a green skin and are covered with little spots (lenticels). The leaves are alternate, set round the branchlets. The common-petioles have very swollen bases ; they run to about $1\frac{1}{2}$ feet in length and bear a rusty down. The pinnæ which bear a similar down are in opposite pairs, a dozen or so ; their bases are swollen and they run to about 7 inches in length.

The very young, undeveloped leaves are tawny. The leaflets are opposite, smooth, lighter below, unequal-sided and attached near the lowest angle.

The **flowers** make a fine show, growing in large, many-blossomed, wide-spreading, stiff, terminal panicles wherein the bronze of the buds contrasts well with the bright yellow of the open flowers. The 5 sepals are curled tightly downwards. They are green with a touch of yellow. The 5 petals are crinkly, have a spread of something under 2 inches and are yellow except that the under surface, and less markedly the upper surface, shows a line of dense, brown hairs. The same hairy growth is found at the base of the stamens and pistil. The former are 10 in number, yellow, with orange anthers, of varying length, the longest being about three-quarters of an inch in length. The pistil is about the same length and has a rounded, green tip. The flower is scented.

The flat **pods** vary from claret colour to nearly black. They grow to about 4 by $1\frac{1}{3}$ inches. In shape they are variable; sometimes nearly a mathematical

oblong, sometimes roughly elliptic, sometimes almost a half-moon shape, but they are always more or less pointed at both ends. There is a stiff wing along each suture and this is commonly rather twisted in the old fruit. The seeds are small and brown and number 1 to 4. The young pod has a rather sticky feel.

POINCIANA ELATA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Vâdarakkâchi, Vêdinârâyana, Vâdinârâyana, Vâdamaḍakki

Telugu, Sunkêsala, Sunkêsvaram, Chiṭikêsvaram

A moderate-sized tree, very common but I have never seen it wild. The foliage is generally sparse and drops in the hot weather. The tree has also very little hold on the ground and these notable advantages led some one to plant it as an avenue tree alongside scores of miles of road in the Trichinopoly district. In full bloom the tree is a pretty sight.

The trunk is smooth, though sometimes gnarled, gray with a yellowish tinge, or whitish-green, and with a gloss on it.

The **leaves** are abruptly bipinnate, the common-petioles being 5 or 6 inches long. The pinnæ run to 9 pairs, 2 or 3 inches in length. There may be as many as 20 pairs of leaflets which are linear or narrow-oblong in shape and half an inch or so long.

The **flower** is slightly fragrant and grows in short racemes which form terminal clusters. There are 5

long, green, narrow, pointed sepals, alternating with which are 5 longer, clawed, broad petals with toothed and wavy margins and measuring more than an inch long and broad. One petal is smaller than the rest, is shaped rather differently and, instead of being white like them, is sulphur-coloured inside. As the flower gets older it changes to a sort of pale-orange or ochreish colour and it is curious that one never seems to find the flower in the process of change, so that the tree seems to bear flowers of two quite distinct colours. The 10 stamens are slender, reddish or orange and very long, running to 4 inches; they bear anthers shaped like the head of a polo-stick. The pistil is slender, green and as long as, or longer than, the stamens.

The **fruit** is a legume, flat and narrow, 6 or 7 inches long by less than an inch broad. It turns reddish-brown in colour.

POINCIANA REGIA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Pânjâlai, Saravâgai

Telugu, Yerratorâyi, Sîmasankêsulu, Sîmachigara

English, Goldmohur, flamboyant, flame-of-the-forest

(Foreign)

It seems probable that the name "gold mohur tree" is a corruption of the Hindustani words "gul mohar" meaning "the rose peacock (tree)." The name "flame-of-the-forest" is inappropriate

here as the tree is never seen in the forest though it is very common where men congregate.

It is a beautiful tree as regards both foliage and flower and splendid when bare of leaves and covered with bloom.

The trunk is smooth, stout and greenish-gray in colour.

The **foliage** has a ferny look. The common-petioles run to a foot and-a-half or so and the pinnæ (there may be 20 or more pairs of them) to about 5 inches. The leaflets are small and narrow and there may be 30 or 40 pairs of them on each pinna.

The impression made by the large **flowers** is that they are uniformly red but, if you look closer, you will see that there is one petal which stands erect and is, on the inside, yellow (or yellowish-white) freaked with crimson. This petal is somewhat suggestive of the outspread tail of a peacock and it is possible that this resemblance gave rise to the Hindustani name referred to above. The mottled petal curls up before the other petals show signs of fading. The 5 sepals are narrow, pointed, green outside and red inside. The 5 petals have long claws and broaden suddenly to a width of about 1½ inches; they are over 2 inches in total length. The stamens are about 2 inches in length and red in colour. The anthers are large and partially violet-coloured. The pistil is long and slender.

The great flat **legume** looks like a sword-sheath. It may be 2½ feet long by a couple of inches broad and goes black.

PARKINSONIA ACULEATA (*Leguminosæ—Cæsalpinieæ*)

Tamil, Dêsattuvêlan, (probably a misnomer), Sînivêlan, Arivâlmûkkupachchilai, Vevvêlan(?) Pachchaivêlan, Parangivêlan—*Telugu*, Sîmatumma, Parangijâli,—*English*, St. John's thorn (a name used, I understand, in the West Indies)

(Foreign)

This pretty and curious little tree is fairly common and is sure to attract attention by its peculiar foliage, the character of which is so difficult to distinguish that Wight calls the leaf pinnate while Brandis, and presumably other modern botanists, declare it to be bipinnate. To the ordinary observer it is a pinnate leaf. Gamble describes the bark as brown but I have always found it to be green and smooth.

The **leaves** (we must call them so) grow in clusters of 2 to 4 out of a very short, thick stalk which really, it seems, forms the common-petiole. This stalk terminates in a sharp thorn and there may be also 2 stipulary thorns. The common-stalk of the apparent leaf (the pinna really) runs to a foot or more in length and is flat and very narrow and resembles a blade of grass; along each side of this common-stalk lie as many as 60 or 70 minute, alternate or opposite leaflets which fold in soon after a leaf is picked and are said to do the same at night. The branchlets zigzag between the leaves.

The **flowers** are small but pretty and grow in racemes. The 5 petals are crinkly, 4 of pale yellow and the fifth with an orange tinge or lightly spotted with red.

The **pods** go brown, are very narrow, run to about 6 inches in length and are constricted between the bulging seeds which are blackish-green and generally number 4 to 7.

PROSOPIS SPICIGERA (*Leguminosæ—Mimoseæ*)

Tamil, Vaṇṇi, parambai—*Telugu*, Sami, jambi

A small or middle-sized tree with a brown, thick, hard, very rough bark. Gum oozes out of the trunk. A curious feature, sometimes observable, is the abundance of green galls. These are roughly globular or in irregular masses and might easily be mistaken for fruit; in fact they appear to be fruits which have become distorted in consequence of disease. The tree bears stout-based prickles.

The **leaves** are bipinnate with slender common-petioles which are only an inch or two long. There are generally 2 or 3 pairs of opposite pinnæ which may be 2 or 3 inches long and bear about 10 pairs of leaflets; these are sessile, opposite, oblong and up to half-an-inch in length.

The **inflorescence** may be described as a raceme of spikes, for the flowers are practically sessile on the slender common-stalks which are several inches long. The flowers are very small and yellow; the

tips of the petals curl over and the conspicuous stamens have large anthers.

The **fruit** is a legume, half a foot or so long, pendulous, more or less cylindrical, very narrow and constricted in places.

Dichrostachys (*or Mimosa*) cinerea
(*Leguminosæ—Mimoseæ*)

Tamil, Viḍatalai—*Telugu*, Veluturu, yaḍatara

The curious parti-coloured flower of this shrub or little, thorny tree will at once attract attention. It is quite common in some places. The bark is light-brown and furrowed.

The **leaflets** are remarkably minute. This is another noticeable peculiarity of the tree and a third is that the spines, which may be a couple of inches or so long, often throw out leaves. It is a pity that the specific name is not more enlightening as to the appearance of the plant.

The short **flower-spike** is a crude combination of pink or magenta and sulphur-yellow. The lower or pink ring consists of a dense mass of sterile flowers and the colour is given by the long, thread-like, anther-less stamens (staminodes). The upper or yellow portion similarly consists of a mass of flowers but these are bi-sexual and the colour is given by the stamens which are shorter than the staminodes. Often the flower-spike is white and yellow and sometimes it is pink and white and yellow and this

variation is due to the fact that the pink staminodes lose colour as they grow older.

The **pods** are narrow, flat and much twisted, run to 2 or 3 inches long and are brown when ripe.

ADENANTHERA PAVONINA (*Leguminosæ—Mimoseæ*)

Tamil, Mânjaḍi, Ânaiguṇḍumaṇi
Telugu, Yênugaguruginja, Yênugagulivinda

A handsome tree with a smooth, brown or grayish bark. I have seen it over 6 feet in girth and 50 or 60 feet high. It is not, I think, likely to be met with on the East Coast out of gardens. The branchlets are dark green.

The common-petioles run to about a foot long. The pinnæ are about half as long and in opposite pairs. The **leaflets** are up to about 18 in number, alternate, elliptic or oblong, dark green, blunt at both ends and rather oblique at the base and grow to about one and a half inches long.

The **flowers** grow in groups of racemose spikes (or spike-like racemes) which are up to about 7 inches in length. The flowers are about one-third of an inch long and across and are set pretty close together. The calyx is inconspicuous and there are five narrow, ray-like petals which are joined at the base. The colour gradually changes from white to golden. There are 10 projecting stamens.

The **pod** splits into two valves which are twisted closely round and round. The young pod is green, flexible and sickle-shaped. It runs to about 10 inches

by half an inch and is tough and stringy. There are usually 9 or 10 seeds, depressed globose in shape and of the appearance of bright red sealing-wax. These seeds are conspicuous when the pod opens. Drury was told that they are poisonous, I that they are edible. I have not attempted to decide the point.

PARKIA BIGLANDULOSA (*Leguminosæ—Mimoseæ*)

Tamil, Mâvukây, Mâvalli

(Foreign)

Quite common in gardens in Madras but I do not remember to have seen it elsewhere.

It is a fine, handsome tree with a general resemblance to *Poinciana regia* but is generally bigger and the leaf has a shorter common-petiole which is downy, whitish above and yellowish below (that of *P. regia* is smooth and green) and which has not the longitudinal furrows of *P. regia*; also the leaflets of *Parkia* are smaller and more numerous.

I have seen it with a girth of 10 feet. The bark is brown or gray and broken or fairly smooth. The under-bark is crimson.

The common-petioles grow to about a foot in length and the slender pinnæ (I have counted 21 opposite pairs of them) to about 5 inches. The leaflets are very small and very numerous. There is a double gland at the base of each common-petiole on the upper side.

The **inflorescence** is peculiar. In large racemes, on thick, flexible stalks reaching 10 inches in length, grow flask-shaped, dark-brown, velvety bodies. These bodies measure (including the neck) about 2 inches in length and the nearly-spherical belly of the flask is between 1 and 2 inches in diameter. These flasks become covered with densely packed, tubular flowers half-an-inch or so in length which, it appears, are bi-sexual above and male below. The lobes of the flowers are tipped with brown but the whole head, when the flowers are out, appears yellowish from the colour of the numerous anthers; in that state the flower-head resembles a badminton ball.

The **fruits** (legumes) hang in big bunches. They have long stalks including which they run to about a foot in length. They have a corkscrew twist, let out a clear gum, and are an inch or so broad and flat but bulge over the large seeds which may number 15 or so. When ripe they turn reddish-brown.

Leucæna glauca

(*Leguminosæ—Mimoseæ*)

Tamil, Tagara maram.—*Telugu* Jilangi, Jîluga

(Foreign ?)

A slender, little tree with dark-gray or brown, smoothish bark, often seen in hedges and betel-gardens.

The **leaves** are bipinnate with slender common-petioles some 6 or 7 inches long. There are generally about half a dozen pairs of pinnæ, 3 or 4 inches long. The leaflets number about 15 pairs; they are narrow, unequal sided, opposite and somewhat pointed.

The **flowers** form densely packed balls, an inch or so in diameter, on stalks an inch or two long. The length of the flower is about half an inch; the body is pale-green but the long, soft stamens are white with yellow anthers. The white styles project beyond the stamens.

The **fruits** are legumes and grow in bunches. They turn dark-brown when ripe, run to about 7 or 8 inches by three-quarters of an inch broad (Brandis wrongly describes them as linear), are flat and many-seeded and bear a little spur at the end.

There are many Acacias and Gamble (*Indian Timbers*) gives the following general rule for guidance towards identification. "With straight spines and the flowers in rounded heads; Farnesiana, planifrons, arabica, eburnea, jacquemontii, tomentosa, kingii, inopinata and leucophlœa. With curved thorns and the flowers in elongated spikes; suma, catechu (including catechu, catechuoides and sundra), ferruginea, senegal, modesta, lenticularis and latronum." This is useful but what does Mr. Gamble mean by saying that *latronum* has curved thorns? I have examined, or had examined, several hundred specimens of *latronum* and never

found curved thorns except such as were obviously deformed.

I will now describe a few acacias, starting with the most familiar.

ACACIA ARABICA (*Leguminosæ—Mimoseæ*)

Tamil, Karuvêlan—*Telugu*, Nallatumma, tumma
English, Babool (the Hindustani)

Commonly a small tree but grows to a good size with a sturdy trunk. It can easily be recognized by—

(1) its great abundance, especially in tank-beds;

(2) its very dark, almost black, trunk and boughs;

(3) its little, fluffy, bright-yellow balls of flowers—"the thriftless gold of the babool";

(4) its long, flexible pods, so constricted between the seeds as to resemble bead-necklaces.

The thorns are very sharp and slender, brown or whitish in colour, an inch or so long, growing in pairs.

The **leaf** is abruptly bipinnate with the common-petiole about 2 or 3 inches long. The pinnæ are opposite, may number 6 pairs and are an inch or so long. The leaflets are opposite and are very small.

The apparent yellow **flower** is a head of flowers very closely set together on a slender peduncle about an inch long. As in other acacias the calyx and corolla are insignificant and the colour is determined by the numerous and comparatively long stamens.

The **legume** is pointed, velvety, whitish and up to about 8 inches in length.

The tree is a preferred habitat of the weaver-birds.

ACACIA LATRONUM (*Leguminosæ—Mimoseæ*)

Tamil, Oḍai, pottâ oḍai (also called sâli but I believe that oḍai is the correct name of this tree and sâli of *A. planifrons*)—*Telugu*, Pakketumma (?), Burujala, Jâle, Paḍajâli, Boggili.

There is no mistaking this horribly thorny shrub or very small tree. In addition to numerous needle-like spines, an inch or so long, there are at intervals wide-branching pairs of huge, hollow, white thorns which may be 3 inches long with a base diameter of about a third of an inch. These large thorns too are cruelly sharp and to make itself more attractive the tree affords lodgment in them to swarms of black ants.

The very slender common-petiole is an inch or so long and generally bears 3 or 4 pairs of pinnæ with minute **leaflets**.

The **flowers** are very small and grow on slender spikes, an inch or two long; they are of the usual acacia type, the numerous, woolly stamens forming the most conspicuous part of the flower; these are white or yellowish.

The **pod** is very flat with small seeds. It goes reddish-brown or almost black and is about half as broad as long (say $1\frac{1}{2}$ inches long by $\frac{3}{4}$ broad). It is slightly curved or falcate and rounded at the ends.

Acacia leucophlœa

(*Leguminosæ—Mimoseæ*)

Tamil, Velvêlan—*Telugu*, Tellatumma, byâla, saraitumma—*English*, it may be called "white babool" as well as anything.

This tree competes with *Acacia arabica* in the matter of ubiquity and abundance and it is distinguishable among acacias by the light colouring of the bark.

In the young tree the bark is smooth and greenish-white or yellowish-white. As the tree grows bigger the bark thickens, roughens and darkens till it becomes piebald or even almost black but there are always on the trunk or boughs traces of the original colour. I have taped it 8 feet round but it is usually a rather small tree and is never very tall.

The **pinnæ** are numerous, 12 or 15 pairs or so, and the minute leaflets are still more numerous. There are thorns in pairs at the bases of the leaves; they branch widely and are straight, strong, dark, an inch or so long.

The tree throws out all over the surface of foliage large panicles of **flower-heads**. These heads are very small, woolly balls of a dirty-white or yellowish colour. Their general effect is to give the foliage, when the tree is flowering, a brown look in consequence of the dense down on the flower-stalks.

The **pod** is small (say 3 or 4 inches long), straight

or curved, narrow (about one-third of an inch in breadth) and flattish. It is covered with a thick, russet or yellowish down. The seeds are small, packed into compartments, generally about 12 or 14 in number.

ACACIA PLANIFRONS (*Leguminosæ—Mimoseæ*)

Tamil, Jâli, Sâli, Oḍḍa, Oḍai, Koḍaivêlan, Koḍaisîtây—*Telugu*, Sâle, Goḍugutumma—*English*, Umbrella tree.

Readily recognized by its flat or canopied, circular head of densely-growing boughs ; the underside bare of leaves. It is very common on stony hill-sides where it often gives the slopes a curious appearance as if they bore rows of projecting shelves. The trunk is brown and either smooth or broken ; the bark is often stained black by the oozings of gum. It is usually a small tree but I have seen it nearly 7 feet in girth.

The plant is armed with pairs of long, slender, white spines, sharp as needles and running to 2 inches in length ; these thorns would be enough, one would think, for all purposes of defence but the tree is further profusely covered with small, brown, slightly-curved spines.

The **leaves** are of the usual bipinnate, acacia type with numerous very small, narrow leaflets.

The **flower-heads** are small, soft balls, the projecting stamens being white with a faint touch of yellow

at the tips; they are on slender stalks and have a slight fragrance.

The **pod** is whity-brown in colour when ripe and curls into tight rings. The seeds are flattened, brown or dark olive-green in colour with a black patch on each side.

ACACIA SUNDRA (classed sometimes as a variety of *A. catechu*) (*Leguminosæ—Mimoseæ*)

Tamil, Parambai, Karungâli

Telugu, Sandra, Chandra, Taredigidda

Not common, in cultivated tracts at all events, but occasionally seen in Madras and elsewhere and conspicuous by a height unusual among the acacias. I have seen it nearly 8 feet in girth. It somewhat resembles a tall babool. The bark is commonly dark-brown though occasionally brownish-gray and is usually very rough.

The **leaves** are abruptly bipinnate; the common-petiole is slender and 3 or 4 inches long; generally there are 3 to 6 pairs of pinnæ (2 or 3 inches long) and under 20 pairs of little, linear leaflets (about one-third of an inch long).

The **flowers** grow on a spike 4 inches or so long and are of the usual acacia type, very small, numerous, resembling little shaving-brushes; the stamens give the colour to the flower and they are white turning yellowish with age; the sepals and petals are greenish.

A thin, flat **pod** running to about 8 inches long by an inch broad; the colour, when ripe, is a red-brown or purple-brown; the end has a small point. The tree bears small thorns in pairs; they have a slight backward curve and one may easily mistake for them the curved horns of a small insect which frequents the boughs and which the Tamil children call "mâḍu" (the cow).

ALBIZZIA AMARA (*Leguminosæ—Mimoseæ*)

Tamil, Usilai

Telugu, Chikkarêni, Nallarêgu, Chigara, Tugli

A very common tree of small to medium size. It resembles the ordinary acacias in appearance and it is an agreeable surprise to find that it has no thorns.

It can often be distinguished among other trees by a slightly bluish tint in the foliage and the contrast between the light-green young leaves and the dark-green old ones is often marked.

The **leaf** is abruptly bipinnate with a common-petiole about 6 inches in length. The pinnæ vary in number to a dozen pairs or so and run to about 2 inches in length. The leaflets are small and oblong and may number 18 pairs or more.

The flowers are fragrant. They grow—not very closely—in a globose head. The corolla is yellow but the long, erect stamens are white. The flower is about half-an-inch long and the greater part of this consists of the protruding stamens.

The **pod** is flat and papery, say 7 by 1½ inches, wavy-edged, slightly twisted, with a narrow, raised border. In colour it is brown when ripe. The seeds are flat and brown.

In the jungles on our low hills this is quite one of the commonest trees.

ALBIZZIA LEBBEK (*Leguminosæ—Mimoseæ*)

Tamil, Kâṭṭuvâgai, Vâgai, Sela-unjal
Telugu, Dirasanam, Yirijapa, Girisappa, Birijapa, Billa, Billavâra, Birisaka

A very common tree. It grows large and has generally a rather straggling look, the foliage being sparse and the boughs large. The biggest I have measured was 9½ feet in girth. It can often be recognized by a certain patchy look about the trunk which is grayish, or brown, or gray blotched with black. The bark is rather rough and often falls off in patches.

The **leaves** are abruptly bipinnate and there are usually 2 or 3 pairs of pinnæ. The common-petioles run to about 10 inches and the pinnæ to about 7. The leaflets which are on short stalks may number 8 pairs; they are somewhat shiny, oblong but slightly broader near the base, bluntly rounded at both ends and very unequal-sided and they run to nearly 2 inches by 1.

The **flowers** are small and very fragrant, scenting the air with a honey-like smell. The most conspicuous thing about them is the numerous, silky

stamens of yellowish-white tipped with green which may be nearly 2 inches long. They grow in many-flowered, globular heads on axillary stalks which run to about 4 inches long and are either solitary or in clusters up to 4. The calyx-tube and corolla-tube together are about a third of an inch long; the former is brownish-green and 5-toothed and the latter is green and has 5 pointed lobes.

The **pods** are generally abundant and in clusters; when young they are green and glitter brightly; later they turn biscuit-coloured and papery and rustle in the breeze. They are very thin and the covers ripple, as it were, over the seeds which may number a dozen or so. The pod runs to 12 inches or so in length by 2 in breadth; the edges are raised.

PITHECOLOBIUM DULCE (or *Inga dulcis*) (*Leguminosæ—Mimoseæ*)

Tamil, Koḍukkâpuḷi, Koṛukkâpuḷi
Telugu, Sîmachinta

(Foreign)

Very common, especially as forming hedges which somewhat resemble hawthorn hedges. I have seen it 8 feet in girth but it is usually a small tree and often very slender, crooked and ill-grown. It can be recognized by the horizontal weals round the gray, smooth trunk.

The **leaves** may be solitary but are generally is clusters and at the base of each leaf or cluster is a

pair of spreading thorns. The common-petiole is slender and generally not more than an inch in length; from it branch two short, slender stalks each of which bears two dull-green, unequal-sided leaflets; these leaflets are oblong or slightly ovate, and flatter along one edge than the other and they run to about 2½ inches in length. The common-petiole and its branches end in little points.

The **flowers** grow in small, woolly heads attached by short stalks to a common-peduncle which may be several inches long. The inflorescence may be described as a raceme of flower-heads. The calyx and corolla are green but the flowers appear to be white or yellowish from the colour of the numerous, soft stamens which are about one-third of an inch long and are slightly tipped with green. The style is long, thread-like and pink in colour.

The **pod** is narrow, somewhat constricted between the seeds and twisted into rings. The end often looks like the sting of a scorpion to which resemblance the Tamil name is apparently due.

PITHECOLOBIUM (or *Inga*) SAMAN (*Leguminosæ—Mimoseæ*)

Tamil, Nellavâgai, Sîmavâgai, Sevappuvâgai, Tûngumûnjikâṭṭuvâgai—*English*, Rain tree

(Foreign)

A very common tree especially in avenues. The last Tamil name refers to the closing of the leaflets at night; indeed they seem to be generally half-

closed in the day-time too. The origin of the inexpressive English name is apparently uncertain; it is commonly said to be due to the leaflets closing during rain but it is also ascribed to the incessant dropping of the secretions of the aphides which swarm on the tree in its native habitat.

The tree grows to a good size (I have seen it 9 feet in girth) and, when well-grown, it has a rather rough, or widely-furrowed, bark which is usually brown but sometimes has a grayish or ochreish tinge. In the young tree the bark is generally marked with narrow, longitudinal furrows. The bark is hard and, when sliced, reddish-brown. The tree is commonly of straggling growth with large boughs which sometimes assume a sort of umbel form.

The **leaves** are bi-pinnate, the pinnæ more or less drooping and commonly consisting of 4 or 5 opposite pairs. The common-petiole runs to about 6 inches long and the end pinnæ they increase in size upwards) are about the same length. The sessile leaflets run to 7 or 8 pairs and gradually increase in size towards the apex of the pinna which gives a sort of splayed look to the foliage. The terminal leaflets which are more or less obovate may be about 3 by $1\frac{1}{2}$ inches; the others are in breadth about one-third of their length, squared at the base, attached by one corner, of a roughly rhomboidal shape. A sort of little "callosity" will be noticed between the bases of each pair of pinnæ; these bases are much swollen. The common-petiole is furrowed and somewhat squared and it and the pinnæ are covered with yellow down.

The **flowers** grow, 20 or so together, in loosely compacted heads. The calyx is greenish and toothed. The corolla-tube is a sort of pinkish-crimson but the limb is generally touched with yellow; commonly it is 5-lobed. Together the calyx and corolla are nearly half-an-inch long. The stamens are numerous, thread-like and erect and project about an inch; their lower half is white, the upper crimson. The central flower of the head is larger than the rest and is bisexual while those around it seem to be male.

The **fruit** is a legume which grows to 9 or 10 inches in length by about three-quarters of an inch in breadth and ends in a little tail. The pod is a good deal swollen and the sutures are much thickened; often it is irregularly constricted here and there between the seeds. The abundant juice exudes as a clear gum. When ripe the fruit turns black and the flesh is then pulpy. The brown seeds (20 or so) are lodged in little compartments.

MILLINGTONIA HORTENSIS (*Bignoniaceæ*)

Tamil, Koraku (from the English), Maramalli, Udirmalagai, Udirpannîr.—*Telugu* Koraku, Boḍḍumalle (?)—*English*, Cork tree

(Foreign)

A good-sized tree, as common as it is beautiful in shape, foliage and blossom.

The light-brown bark is often exceedingly rough,

thick and broken. In fact it is just like cork and hence its very commonplace English name.

The **leaves** are opposite and decussate with common-petioles running up to 20 inches or so long. There is a terminal leaflet and seven, or fewer, opposite pairs of pinnæ which themselves carry a terminal leaflet and one, two or three pairs of lateral leaflets on very short stalks. The leaflets are of a dull, dark green as are the petioles and petiolules. In shape the leaflets are ovate-lanceolate or elliptic-lanceolate and acuminate, the margins being sometimes slightly and irregularly serrated; they run to 4 by over 2 inches.

The glory of the tree is in its masses of very sweet, white **flowers** the general effect of which I can compare to nothing so well as to bursting white rockets. They grow in large panicles, the blossoms hanging straight downwards when about to fall. The calyx is a very small green cup but the slender, white corolla-tube is about $2\frac{1}{2}$ inches long, opening into 5 lobes, one cleft being shallower than the other four. The 4 yellow-headed stamens are fixed to the mouth of the tube and project but not so far as the white pistil.

The **fruit** is a flat, curved capsule, containing a longitudinal partition or dissepiment. It grows to about 18 inches long by something under an inch broad and about a sixth of an inch thick. When ripe it is brown in colour and filled with flat seeds round each of which spreads a fanshaped, transparent wing. Including the wing the seed is an inch or so long.

Tripinnate Leaves

TRIPINNATE LEAVES

Melia azedarach

(See under Bipinnate leaves.)

Moringa pterygosperma (*Moringaceæ*)

Tamil, Murungai—*Telugu*, Munaga, Mulaga
English, Drumstick tree or Horseradish tree

This tree which carries refinement to the point of producing tripinnate leaves is best known through the medium of curries for which the seed-vessels are used. It is commonly a small, slender tree with a smooth, sometimes knobby, bark of greenish, grayish or silvery colour. I saw once in Madura a specimen of the wild (kâṭṭu or malai) murungai but I am doubtful whether it was *M. pterygosperma* or *M. concanensis*. It was a tall, handsome tree and, so far as I could judge (prickly-pear prevented measurement), about 12 feet in girth. The light-brown bark was very rough and ridged, corky in texture and blotched with oozings of gum which was yellow when fresh and crimson when hard. The fruit of this tree was said to be bitter and it was evidently the tree called kasamunaga in Telugu.

To revert to the common cultivated variety.

The **foliage** has a light, airy, graceful look. The leaves are alternate. The common-petiole

is downy and rather lax. In an average leaf the common-petiole may be about $1\frac{1}{4}$ feet long; there may be about 6 pairs of opposite pinnæ, growing at wide intervals, attaining a length of about 6 inches and diminishing towards the top where simple leaflets take the place of pinnæ; the pinnules are arranged on the same plan as the pinnæ, may bear 2 or 3 pairs of leaflets and a terminal, are slender and run to a couple of inches or so in length. The leaflets are dull, smooth, paler below, elliptic or more or less obovate, sometimes slightly emarginate; in size very variable, from one-third of an inch or so to about $1\frac{1}{4}$ inches, the terminals being largest. Occasionally the place of a leaflet is taken by a sub-pinnule bearing 3 leaflets; the leaf then becomes quadripinnate.

The small, scented **flowers** grow in wide-branching, stiff, axillary panicles. The calyx-tube is green with 5 narrow, white, petaloid lobes, half an inch or more long, which are thrown back towards the stalk. There are 5 white or yellowish petals of which one stands out straight and the others bend back and away from it; the petals may be three-quarters of an inch long and are narrow, especially towards the base. The 5 yellow-headed stamens crowd round the pistil. There are staminodes in addition.

The young **capsule** is flexible and slender. It grows into a green, ridged, pointed, slender vessel, up to 18 inches or so long, containing numerous, small, winged seeds.

The tree is common everywhere in native gardens.

Digitate Leaves

DIGITATE LEAVES

ERIODENDRON ANFRACTUOSUM (*Malvaceæ* or *Bombaceæ*)

Tamil, Elavan—*Telugu*, Bûruga
English, White silk-cotton tree

This tree is common but apparently of foreign origin. It is one of the four whorled trees referred to under *Ailanthus excelsa* and must be carefully distinguished from *Bombax malabaricum*. As I have indicated under *Sterculia fœtida*, the smallness of the leaflets and the shortness of the petiolules serve for this purpose; besides, *Bombax* has a red flower and *Eriodendron* a white one; *Bombax* too has a crimson under-bark. The tree is conspicuous by its slender, straight, smooth, green (in big specimens gray or silvery) trunk and by its widely separated whorls of slender, horizontal branches. The largest I have measured was 5 feet in girth. The trunk bears prickles, sometimes in great numbers. These prickles are conical, of a light, corky texture and are sometimes nearly 2 inches in diameter at the base and about $1\frac{1}{2}$ inches high, but they are more often quite small.

The digitate **leaves** are alternate on reddish petioles running to about 6 inches in length. The petiolules are very short. The leaflets vary in number, but are, perhaps, most commonly 7. They are lanceolate with a

short acumen or point and may measure about 5 inches in length by something over an inch in breadth.

The **flowers** grow solitary, or, more commonly, in little, axillary clusters, on peduncles an inch or so long, at the ends of the branchlets, usually appearing when the tree is not in leaf. The buds resemble little, green pears. The calyx-tube is large and has 4 or 5 teeth. The whole flower has a length of about $1\frac{1}{2}$ inches and a spread of about the same. The petals are rather waxy looking and of a yellowish-white colour; they usually number 5, but I have found 7. There are 5 long, white stamens with large, twisted, wrinkled, yellow anthers; the stamens cohere at the base. The style is long and white, slightly tipped with brown.

The **fruit** is a capsule which may be about 5 inches long by 6 inches round; it is spindle-shaped and, hanging on the leafless trees, is very noticeable; green to light-brown in colour; woody and hard of shell when ripe. The interior is packed with the softest, silky, white wool wherein lie embedded the numerous, small seeds which ultimately turn black.

BOMBAX MALABARICUM—(*Malvaceæ* or *Bombaceæ*)

Tamil, Pongi, Olaga, Kâṭṭelavan, Mulluelavan, Pula—*Telugu*, Bûruga—*English*, Red silkcotton tree

See remarks under *Ailanthus excelsa*, *Sterculia fœtida* and *Eriodendron anfractuosum*.

This tree is much less common in inhabited parts than *Eriodendron*. It is also a much bigger tree

and throws out large buttresses. Trunk and boughs alike are often covered with a dense growth of large, conical prickles. The trunk is grayish-brown and the bark is somewhat broken in big trees. The under-bark is crimson. The branches are whorled.

The **leaves** are digitate and alternate. The common-petioles are reddish and run to 9 inches or so in length. The petiolules are an inch or so long. The leaflets are perhaps most commonly 5 in number. They are elliptic-lanceolate or oblong-lanceolate, generally end in a pretty long, thin tail and may grow to about $6\frac{1}{2}$ by $2\frac{3}{4}$ inches.

The **flowers** are very large and conspicuous and grow on short, stout peduncles. There is a big, green or reddish, fleshy calyx-tube with 3 or 4 teeth. The petals are 5 in number, pale-crimson in colour (said to be sometimes white), 3 or 4 inches in length and about $1\frac{1}{2}$ inches in breadth. The red, dark-headed, projecting stamens are about 2 inches long and very numerous. They grow in six groups, whereof one is central and the others form a ring round it. Of the stamens in the middle 5 have forked filaments with an anther on each prong. The style is long, red, with 5 prongs. Very fine the tree looks when the leafless boughs are covered with blossoms.

The **fruit**, which much resembles that of *Eriodendron anfractuosum*, is a capsule with 5 faces divided by slight ridges; 3 or 4 inches long by 5 or 6 in circumference. It turns blackish when ripe and contains a papery, 5-ridged core or axis, numerous small dark seeds and a mass of beautifully soft, silky wool.

ADANSONIA DIGITATA (*Malvaceæ* or *Bombaceæ*)

Tamil, Pâpârapuliyan, Bûrimaram, Ânaipuliyan, Sîmapuliyan—*English*, Baobab

(Foreign)

This tree is getting common enough to merit mention and the peculiarity of the trunk makes it unmistakeable. The lower part of the trunk has a monstrous, diseased fleshiness suggestive of elephantiasis and is altogether out of proportion to its height, the girth diminishing rapidly. So much for the tree in the graceful slimness of youth. When it gets old all sense of shape and proportion is lost and the trunk becomes a mountainous deformity. In this state I have measured a specimen in Madras 64½ feet round and it grows, by accounts, to still more outrageous dimensions. The bark is gray and smooth, save for pimples and creases.

The **leaves** are digitate, alternate or sub-opposite and set on at varying angles. The leaflets vary in number up to 7. They are sessile on the head of a common-petiole running to about 7 inches long; measure anything up to about 7 by 2½ inches and are oblong-lanceolate and acuminate.

The **flower** is very large and hangs solitary on a long, stout stalk. The calyx-tube has 5 large, pointed lobes, externally green, internally yellowish but covered with a dense, silvery plush. Outstretched the calyx-lobes may have a spread of 6 inches or so. There are 5 white, fleshy petals, which may be 3½ inches long and nearly as broad,

the total spread of the flower being sometimes over 7 inches. The thick, white staminal-tube is about 1½ inches long and is topped by a mass of innumerable, slender, white filaments, an inch or so long, bearing small, brownish anthers. The lower part of the pistil is thick, yellowish and furry; the style is white, stout, 3 or 4 inches long and topped by a ring of narrow rays.

The **fruit** is a great, cylindrical berry, commonly about 14 inches long by 10 or 11 inches round. It hangs on a long stalk which may be a foot or so long. It is a sort of olive-green in colour, feels and looks exactly as if it were covered with velvet and has a long beak or snout. Altogether it has a sort of resemblance to a mole if one can imagine a green mole. The rind is stout and tough. Inside the fruit is divided into chambers filled with a white, mealy, rather sour pulp in which the numerous, brown, shiny, kidney-shaped seeds are embedded. The fruit is edible and the sour taste makes the pulp more refreshing than one would expect from its appearance.

STERCULIA FŒTIDA (*Sterculiaceæ*)

Tamil, Oṭṭaipuḍukku, Pînâri

Telugu, Gurrapubâdam

The leaves of *Sterculia fœtida*, *Bombax malabaricum* and *Eriodendron anfractuosum* are sufficiently alike to render some care necessary in order to avoid confusion. *Sterculia* and *Eriodendron* have

very short peticlules; those of *Bombax* run to an inch or so long. The common-petioles and leaflets of *Sterculia* are considerably longer than those of the other two and the leaflets of *Bombax* are a good deal larger than those of *Eriodendron* in which latter, besides, the veining is only faintly marked. The common-petioles of both *Bombax* and *Eriodendron* are reddish.

Sterculia fœtida is a large, handsome tree with a smooth, grayish-brown bark and, commonly, large buttresses. Th branches are *not* whorled and sometimes the smaller branches rise perpendicularly out of the large ones.

The **leaf-bearing** branchlets are clustered at the ends of the boughs. The common-petioles, of light green colour, run to a foot in length. The petiolules are very short. The leaflets run to about 10 by 3 inches but are commonly about 6 by 1½ inches. They number 7 or fewer, are elliptic-lanceolate or oblong-lanceolate, taper gracefully towards both ends and often bear a long acumen.

The **flowers** have a sweetish and yet most sickening smell. They grow in panicles half a foot or more long which cluster at the end of the branchlets. The flowers are either unisexual or bisexual. There are no petals but their place is taken by 5 narrow, pointed, downy, rather fleshy calyx-lobes with a spread of about 1½ inches. The colour of the calyx-lobes outside varies from greenish to a sort of brown-crimson, like old port-wine; inside the calyx is of the same brown-crimson colour or else of a dull purple,

the margins of the lobes being lighter or greenish. In the middle of the flower is a long, curved stalk ending in a rounded head. This, in the male flower, is formed by the cohering stamens but, in flowers with female organs, it is a gynophore with stamens adherent thereto.

The **fruits** which sometimes grow in clusters, radiating from a common centre, are remarkable, though whether the shape is accurately described by one of the Tamil names for the tree I am not naturalist enough to say. They consist of large follicles about 11 inches round in one direction and about 8 inches round in the other. The fruit is rounded except on one side which is flat with a hump on it; the end is beak-shaped. The side opposite to the flat side is traversed by a deep slit with swollen lips. The tough, thick case contains a cavity in which grow on stalks ellipsoidal seeds about an inch long. The fruit is smooth and green when young; later it turns scarlet and the seeds turn a leaden black. The seeds are eaten roasted or raw; in the latter state they have a rather nut-like taste.

Monocotyledons

MONOCOTYLEDONS

PANDANUS ODORATISSIMUS (or *tectorius*) (*Pandanaceæ*)

Tamil, Tâḷai—*Telugu*, Mogali—*English*, Screw-pine

Very common especially where there is water and sand. Easily recognized by the long, tapering, sword-shaped leaves bearing sharp teeth along their edges and along the back of the midrib and growing in a close, three-fold spiral. The English name refers to the likeness between the leaves of this plant and those of the pineapple.

The tree is sometimes over 20 feet high. The trunk is covered with a light-brown skin in wavy rings and it and the branches are thickly hung with the sheathing dead leaves up to the point where the twisted leaf-crowns begin. Adventitious roots, as they are called, are often thrown out from the trunk to prop it up.

The **flowers** are worth study. The male inflorescence consists of a thick spike or spadix, a foot or more long, bearing creamy-white or yellow leaves each of which serves as a sheath to a spike 2 or 3 inches long. These latter spikes are densely covered with a matted growth of flowers each consisting of a staminal column set, as to its upper part, with pointed anthers. These flowers are half an

inch or less in length and contain a lot of farina—a soft, floury stuff.

The aforesaid white or yellow sheaths or spathes are much in favour with the Hindu women as a decoration for the hair. The yellow spathes are regarded as singularly delicious in smell. They are certainly more strongly flavoured than the white but the scent is disagreeable in my opinion, a mixture of pineapple and mushrooms.

The female inflorescence seems to be much rarer than the male. It consists of three terminal groups of white leaves (three leaves to the group) surrounding a simple spike on which grow the flowers in a dense mass. These develop into a closely packed collection of fibrous, one-seeded **fruits**. When this cluster of fruits is fully developed, it is gorgeous as a freshly painted German toy and bears a certain resemblance to a pineapple: a huge ellipsoidal or oval body about a foot long and two feet round, of a brilliant, orange-red colour. At this stage the fruits have separated into detached groups, each group containing up to 20 or more fruits and the whole mass containing 60 or more such groups. The fruit is reckoned as edible but (judging by my experience) only by boys.

Palmæ

The palms are so conspicuous and so easily recognized that it is not necessary to do more than name the principal ones and say a few words as to their appearance. The cocoanut (*Cocos nucifera*) has

pinnate leaves, the leaflets being long and narrow. The wild date (*Phœnix sylvestris*) also has pinnate leaves but is distinguishable by the large scales on the trunk and by its masses of bright, orange-coloured, little dates. The areca (*Areca catechu*), another pinnate-leaved palm, has a singularly graceful, slender, ringed, gray stem. The bastard sago (*Caryota urens*) has bi-pinnate leaves cut into curious fish-fin-like leaflets; it is distinguished, in addition, by its monstrous inflorescence which looks like a huge, dangling tassel. The palmyra (*Borassus flabelliformis*) has a leaf resembling a great, rounded fan with long, pointed, projecting ribs. The talipot (*Corypha umbraculifera*) has a leaf like the palmyra but larger still and develops at its crown a gigantic, pyramidal inflorescence. A handsome foreign palm not often seen outside Madras is the Royal Wine Palm (*Oreodoxa regia*). Its foliage is pinnate and it can be recognized by the stem which gradually swells towards the middle and then diminishes into a long green point or ferule.

Colour of Flowers

COLOUR OF FLOWERS

Trees arranged according to the prevailing colour of their petals (except where otherwise noted)

Green

Ægle marmelos
Ailanthus excelsa
Albizzia lebbek.
Anogeissus acuminata (calyx)
Anona squamosa
Artocarpus incisa
Artocarpus integrifolia
Balanites roxburghii
Barringtonia acutangula
Careya arborea
Diospyros montana
Elæodendron glaucum
Feronia elephantum
Holoptelea integrifolia (perianth)
Jatropha curcas
Niebuhria linearis (calyx)
Odina wodier
Pithecolobium dulce
Pithecolobium saman
Polyalthia longifolia
Santalum album (calyx)
Semecarpus anacardium
Stephegyne parviflora
Strychnos nux vomica
Swietenia macrophylla
Terminalia catappa (calyx)
Trewia nudiflora (calyx)

Brown

Gmelina arborea
Heterophragma adenophyllum

White

Acacia latronum (stamens)
Acacia leucophlœa (stamens)
Acacia planifrons (stamens)
Acacia sundra (stamens)
Adansonia digitata
Ægle marmelos
Alangium lamarckii
Aleurites moluccana
Averrhoa carambola
Azadirachta indica
Bauhinia racemosa
Bauhinia triandra
Bauhinia variegata
Berrya ammonilla
Bixa orellana
Cæsalpinia coriaria
Calophyllum inophyllum
Carica papaya
Cerbera odollam
Chloroxylon swietenia
Coccoloba uvifera
Cordia myxa
Cratæva religiosa
Dichrostachys cinerea
Dillenia indica
Diospyros montana
Diospyros sapota
Dolichandrone arcuata
Dolichandrone crispa
Eriodendron anfractuosum
Eugenia jambolana (stamens)
Guettarda speciosa
Ixora alba
Ixora parviflora
Leucæna glauca (stamens)
Melia azedarach
Millingtonia hortensis
Mimusops elenghi
Morinda citrifolia
Morinda tinctoria
Moringa pterygosperma
Murraya kœnigii
Odina wodier
Parkia biglandulosa
Phyllanthus emblica (calyx)
Pithecolobium dulce (stamens)
Plumeria alba
Plumeria acutifolia
Poinciana elata
Pongamia glabra
Premna tomentosa
Psidium guayava

White—(cont.)

Pterocarpus marsupium
Pterospermum suberifolium
Sapindus emarginatus
Sesbania grandiflora
Spondias mangifera
Swietenia mahagoni
Tectona grandis
Terminalia Arjuna (calyx)
Wrightia tinctoria
Zizyphus jujuba

Yellow

Acacia arabica (stamens)
Acacia latronum (stamens)
Adenanthera pavonina
Albizzia amara
Avicennia officinalis
Bassia longifolia
Bauhinia tomentosa
Cassia fistula
Cassia florida
Dalbergia latifolia
Dalbergia sissoo
Dichrostachys cinerea
Dolichandrone stipulata
Givottia rottleriformis
Gmelina arborea
Guazuma tomentosa
Gyrocarpus jacquini (calyx)
Hæmatoxylon campechianum
Heterophragma adenophyllum
Hibiscus tiliaceus
Mangifera indica
Odina wodier
Parkinsonia aculeata
Peltophorum ferrugineum
Phyllanthus emblica (calyx)
Pithecolobium saman
Polyalthia longifolia
Prosopis spicigera
Protium caudatum
Pterocarpus indicus
Pterocarpus marsupium
Petrocarpus santalinus
Sesbania ægyptiaca
Strychnos potatorum
Tecoma stans
Terminalia belerica
Terminalia chebula (calyx)
Thespesia populnea
Thevetia neriifolia
Zizyphus jujuba

Pink

Anacardium occidentale
Bixa orellana
Cassia Roxburghii
Dichrostachys cinerea
Kleinhovia hospita
Melochia velutina

Orange, Red or Scarlet

Butea frondosa
Cordia sebestena
Cordia tectonifolia
Erythrina indica
Feronia elephantum
Poinciana elata
Poinciana regia
Protium caudatum
Punica granatum
Santalum album (calyx)
Spathodea campanulata
Tamarindus indica.

Crimson, Magenta or Maroon

Averrhoa bilimbi
Balsamodendron berryi
Bauhinia purpurea
Bauhinia variegata
Bombax malabaricum
Couroupita guianensis
Crescentia alata
Dichrostachys cinerea
Kigelia pinnata
Santalum album (calyx)
Sesbania grandiflora
Sterculia fœtida (calyx)

Purple

Averrhoa carambola
Balsamodendron berryi
Cordia myxa
Diospyros montana
Lagerstrœmia Flos Reginæ (pale)
Sesbania ægyptiaca.

Lilac or Mauve

Bauhinia variegata
Bignonia megapotamica
Lagerstrœmia Flos Reginæ
Vitex negundo

Blue

Memecylon edule

Shape and Size of Fruit

SHAPE AND SIZE OF FRUIT

Trees arranged according to the shape and size of their fruits

Of all sizes, more or less flattened and having the general appearance of a pea-pod.

Acacia arabica
Acacia latronum
Acacia leucophlœa
Acacia planifrons (much twisted)
Acacia sundra
Adenanthera pavonina
Albizzia amara
Albizzia lebbek
Bauhinia
Butea frondosa
Cæsalpinia coriaria (much twisted)
Cassia florida
Dichrostachys cinerea
Erythrina indica
Hœmatoxylon campechianum
Leucæna glauca
Millingtonia hortensis
Parkia biglandulosa
Parkinsonia aculeata
Peltophorum ferrugineum
Pithecolobium dulce
Pithecolobium saman
Poinciana elata
Poinciana regia
Pongamia glabra
Sesbania ægyptiaca
Sesbania grandiflora
Tamarindus indica

Long, slender, more or less cylindrical.

Bignonia megapotamica
Cassia fistula
Cassia Roxburghii
Dolichandrone arcuata (?)
Dolichandrone crispa
Dolichandrone stipulata

Long, slender, more or less cylindrical—(cont.)

Heterophragma adenophyllum
Moringa pterygosperma
Plumeria alba
Prosopis spicigera
Spathodea campanulata
Tecoma stans
Wrightia tinctoria

Long, stout, more or less cylindrical.

Adansonia digitata
Kigelia pinnata

More or less round or oval, not much exceeding an inch in length.

Alangium Lamarckii
Azadirachta indica
Balsamodendron berryi
Barringtonia acutangula
Calophyllum inophyllum
Coccoloba uvifera
Cordia myxa
Cordia sebestena
Cordia tectonifolia
Diospyros montana
Elæodendron glaucum
Eugenia jambolana
Givottia rottleriformis
Gmelina arborea
Guazuma tomentosa
Guettarda speciosa
Hibiscus tiliaceus
Ixora parviflora
Jatropha curcas
Lagerstrœmia Flos Reginæ
Melia azedarach
Memecylon edule
Mimusops elenghi
Morinda citrifolia
Morinda tinctoria
Murraya kœnigii
Niebuhria linearis
Odina odier
Phyllanthus emblica
Polyalthia longifolia
Premna tomentosa
Protium caudatum
Sapindus emarginatus
Santalum album
Strychnos potatorum
Terminalia belerica
Thespesia populnea
Trewia nudiflora
Vitex negundo
Zizyphus jujuba

More or less round or oval, of larger size.

Ægle marmelos
Aleurites moluccana
Anona squamosa
Artocarpus incisa
Averrhoa bilimbi
Balanites Roxburghii
Bassia longifolia
Bombax malabaricum (five-sided)
Careya arborea
Cerbera odollam
Chloroxylon swietenia
Cratæva religiosa
Crescentia alata
Dillenia indica
Diospyros sapota
Eriodendron anfractuosum
Feronia elephantum
Mangifera indica
Psidium guayava
Pterospermum suberifolium
Punica granatum
Spondias mangifera
Sterculia fœtida
Strychnos nux vomica
Swietenia macrophylla
Swietenia mahagoni
Terminalia catappa
Terminalia chebula
Thevetia neriifolia

More or less round or oval, very large.

Artocarpus integrifolia
Carica papaya
Couroupita guianensis
Pandanus odoratissimus

With distinct wings of circular or other shape.

Ailanthus excelsa
Anogeissus acuminata
Berrya ammonilla
Gyrocarpus Jacquini
Holoptelea integrifolia
Pterocarpus indicus
Pterocarpus marsupium
Pterocarpus santalinus

With relatively high ridges.

Averrhoa carambola
Melochia velutina.
Terminalia arjuna

Not falling under the above classes.

Anacardium occidentale
Bixa orellana
Casuarina equisetifolia
Dalbergia latifolia
Dalbergia sissoo
Ficus
Kleinhovia hospita
Semecarpus anacardium
Stephegyne parviflora
Tectona grandis

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Axil: the upper angle between a leaf and the twig from which it grows.
Axillary: placed in an axil.
Axis: the central line or support around which parts are arranged; so the trunk of a tree may be regarded as its axis.
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Common-petiole or rhachis: the prolonged petiole of a pinnate leaf which corresponds to the midrib of a simple leaf and which bears the leaflets or the secondary petioles (pinnæ).
Composite flower: an aggregation of flowers into a single head on a common receptacle.
Compound leaf: a leaf divided into separate and distinct leaflets.
Compressed: flattened at the sides.
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Cordate leaf: a heart-shaped leaf, that is, a round-based leaf notched at the point where the blade and stalk join.
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Corolla: counting from the outside, the second whorl of the modified leaves which form the flower.
Corymb: a shortened raceme in which the lower flower-stalks are longer than the upper so that the top of the inflorescence is flat or convex.
Corymbose: having the form of a corymb.
Corypha umbraculifera 194
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Crenate: applied to the margin of leaf when it has rounded (as opposed to pointed) teeth.
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Cyme: an inflorescence in which the main axis ends in a flower and further flower-development then takes place in the form of lateral branches from the axis.
Cymose: having the form of a cyme.

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Decussate: applied to leaves arranged in pairs in such a way that each pair is at right angles to the pair above and the pair below.
Dehiscent: applied to fruits which open at maturity to disjoin the carpels or to discharge the seed.
Dentate: applied to the margin of a leaf when it has pointed teeth

which are directed outwards.
Depressed: flattened from above downwards, thus a depressed globose fruit is a fruit of globular form which is noticeably flattened at the top.
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Diœcious: used of unisexual flowers when the males and females grow on separate plants.
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Dissepiment: a partition; especially applied to partition-walls in the ovary.
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Drupe, a stone-fruit; a fruit (usually developing from a single carpel) of which the outer portion of the pericarp is fleshy while the inner part forms a hard case round the seed and which does not open to set free the seed.
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Ellipsoid : a solid of elliptical shape.
Elliptic leaf : a leaf with a regularly curved outline intermediate between the narrower oblong and the broader rotundate.
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Endocarp : the inner portion of the pericarp (the portion of the fruit surrounding the seeds) which in the drupes becomes hard and forms the so-called 'stone'.
Equally pinnate leaf : a pinnate leaf which has not got an odd terminal leaflet.
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Filament : the stalk which supports the anther.
Fimbriate : having a fringe of fine processes.
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Gland: a transparent, oil-secreting vesicle in the leaf-tissue; a more or less prominent swelling on a leaf, stalk or other part, performing secretive or other functions; a lobe of the disk or of the involucre of euphorbia.
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Imparipinnate leaf: a pinnate leaf ending in an odd terminal leaflet.
Indehiscent fruit: a fruit which does not open at maturity to set free the seeds.
Indian almond 26
Indian laburnum 144
Induga 61
Indupu 61
Inflorescence: the flower scheme; the collection of flowers on a flowering shoot which bears more than one flower.
Inga dulcis 178
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Ingaiumullu 99
Involucre: a ring of bracts enclosing a cluster of flowers.
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Ippi 50
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Îruvalli 103
Iruvuḍu 137
Itti 137
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Ixora polyantha 47

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Juvvi 92

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Kâṭṭâmanukku 80
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Kâṭṭumâ 133
Kâṭṭumurukkan 109
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Keel: the two lowest petals of a papilionaceous flower which have together a vague resemblance to a boat.
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Kiḷuvai 123
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Kuragumanjal 5
Kuriviyâlan 91
Kukuṭi 130
Kûṭi 130

L

Lagerstrœmia Flos Reginæ 38
Lakkili 115
Lamina: the blade of a leaf, the expanded portion of a clawed petal.
Lanceolate leaf: a narrow leaf shaped like a lance head, tapering toward both ends and broadest near the base.
Lanjamuṇḍikîrai 70
Lawsonia alba 107
Leaflet: a distinct leaf-like portion of a compound leaf.
Legume: a fruit which is composed of a single carpel, is dry and opens by two sutures to set free the seed.
Lemon 17
Lenticel: a spot or line on the bark indicating a hole or crack to admit air.
Lettuce tree 70
Leucæna glauca 169
Limb: the uppermost, expanded portion of a calyx-tube or corolla-tube.
Lime 17

Linear leaf: a very narrow leaf with parallel edges, intermediate between the acicular (or needle-like) and the oblong.
Lingachima 135
Lobe: in particular a division of a leaf or of a calyx-tube or corolla-tube which is larger than a mere tooth.
Logwood 149
Lôluga 10

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Manjanatti 47
Maradâṇḍi 107
Marakumalan 66
Marâle 58
Maramalli 181
Marasorakây 148
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Margin: in particular the edge of a leaf or leaflet.
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Millingtonia hortensis 181
Mimosa cinerea 166
Minusops elenghi 49
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Mogali 192
Monocotyledons: the great group of plants in which the embryo possesses only one leaf.
Morinda citrifolia 47
Morinda tinctoria 48
Moringa concanensis 183
Moringa pterygosperma 183
Muchchiṭanki 51
Mucronate leaf: a leaf in which the midrib projects beyond the blade in the form of a little, stiff bristle.
Mûkûrti 18
Mulaga 183
Mûlaga 47
Mullatummika 51
Muḷḷu elavan 186
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Muḷḷumurugai 108
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Mundirikoṭṭai 20
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Nimma 18
Nirasi 18
Nîrkaḍambai 43
Nîroddi 150
Nochi 115
Node : the point on the stem from which a leaf is given off.
Nona 47, 48
Nut : a fruit which is composed of more than one carpel but contains only one seed, has a hard, dry pericarp and does not open to set free the seed.

O

Obconical : conical but attached at the pointed end.
Oblanceolate ; lanceolate but broadest towards the apex.
Oblong leaf : a leaf approaching the mathematical oblong in shape but used also in this book to denote a narrowly elliptic leaf.
Obovate : egg-shaped in outline with the broader end towards the apex.
Obovoid : of a solid, egg-

shaped with the broader end towards the apex.
Obtuse : blunt or rounded at the apex.
Oḍai 172, 174
Oḍḍa 174
Oddi 150
Odina wodier 132
Odiyan 132
Olaga 186
Opposite leaves : leaves growing in pairs, the one leaf opposite to the other.
Orange 17
Orbicular leaf : a leaf circular in outline.
Oreodoxa regia 194
Oṭṭaipuḍukku 189
Ovary : the hollow base of the pistil in which the seeds develop.
Ovate leaf : a leaf with an egg-shaped outline, broader at the attached end than at the apex.
Ovoid : of a solid, egg-shaped, the attached end being broader than the other.

P

Pachchaivêlan 164
Pachchân kalli 75
Pâchi 28
Paḍajâli 172
Paḍavîya 154
Pagoda tree 55
Pakketumma 172
Palâ 95
Palâs 109
Pâlavireni 58
Palmæ 193
Palmatifid leaf : a simple leaf with segments or lobes radiating from the end of the leaf-stalk, the divisions between the segments not being very deeply cut.
Palmatipartite leaf : the same as a palmatifid leaf with this difference that the divisions extend nearly to the leaf-stalk.
Palmyra 194
Pamparapanasa 18
Pamplimâsî 18
Panasa 95
Pandanus odoratissimus (tectorius) 192

Panicle : a compound raceme, that is, an inflorescence of racemose type wherein the main flower-stalk throws out branching flower-stalks instead of simple stalks bearing each a single flower as the raceme does; the term is also used to include a compound cyme.
Pânjâlai 162
Pannîr 44
Pannîrmaṇḍâre 102
Pâpârapuliyan 188
Papilionaceous flower : a flower of the type of the common pea-flower.
Pappây 40
Pappi 40
Pappili 40
Parakiluvai 107
Parambai 165, 175
Parangijâli 164
Parangivêlan 164
Paripinnate leaf, a pinnate leaf which has not got an odd terminal leaflet.
Paritium tiliaceum 7
Parkia biglandulosa 168
Parkinsonia aculeata 141, 164
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Pedda âre 101
Peddairiki 62
Pedda jemuḍu 76
Peddakaḷinga 1
Peddamaddi 23
Peddamânu 122
Peddavêpa 122
Peddêgi 139
Pedicel : the ultimate stalk which bears a single flower in an inflorescence.
Peduncle: the stalk of a flower which grows singly or of a flower-head; in a branching inflorescence the common-peduncle, or axis of inflorescence, is usually called the rhachis.
Peepul 88
Peltophorum ferrugineum 159

Perianth : the calyx and corolla collectively, but specially used to denote the floral envelope when only a calyx or only a corolla is present or when the calyx and corolla are not readily distinguishable from each other.
Periya udiya 150
Persian lilac 157
Perumaram 122
Petal : one of the modified leaves which constitute the corolla.
Petiole : the stalk of a leaf ; in a compound leaf the common-petiole, or rhachis, is the stalk from which the leaflets or leaflet-bearing stalks spring.
Petiolule : the stalk of a leaflet.
Peykaḍambai 43
Phœnix sylvestris 194
Phyllanthus emblica 78 155
Pîdrapoliki 72, 83
Pîmaram 122
Pînâri 189
Pinna : in a bi-pinnate or tri-pinnate leaf, a stalk branching from the common-petiole and bearing, in the one case leaflets, in the other case stalks (pinnules) which bear leaflets.
Pinnai 6
Pinnate leaf : a compound leaf bearing leaflets along each side of the rhachis or common-petiole of the leaf.
Pinnatifid : descriptive of a simple leaf the margins of which are cut into lobes which are arranged along either side of the midrib.
Pinnatipartite : descriptive of a pinnatifid leaf in which the divisions between the lobes extend nearly down to the midrib.
Pinnule : in a tri-pinnate

leaf a stalk bearing leaflets directly.
Pisonia alba (morindæfolia) 70
Pistil: the female organ of a flower, consisting of the ovary, the stigma and, commonly a style.
Pithecolobium dulce 112 178
Pithecolobium saman179
Plumeria acutifolia (acuminata) 55
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Poppoy 40
Porasu 109, 129
Portia 8
Pottâkalli 76
Pottâ ôḍai 172
Premna tomentosa 67
Prickle: a thorn originating from the bark only.
Prosopis spicigera 165
Protium caudatum 123
Psidium guayava (guava, pomiferum, pyrifeрum) 32
Pterocarpus indicus 138
Pterocarpus marsupium 139
Pterocarpus santalinus 111
Pterospermum subericifolium 10
Pûchikây 130
Pudding-pipe tree 144
Pudumaddi 51
Pula 33, 186
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Pungan 140
Punica granatum 39

Puntêkku 14
Pûtatammi 33
Pûvaṇḍi 130
Pûvarasu 8

R

Raceme : the form of inflorescence in which the main flowering shoot gives off simple stalked flowers in succession until it ceases to lengthen.
Râgi 88
Raintree 179
Ranpâlai 149
Râvi 88
Receptacle : the more or less enlarged top of the flower-stalk which bears the floral organs.
Red sanders 111
Red silk-cotton tree 186
Rêgi 19
Rêgu 19
Rêla 144
Rêngu 19
Rêni 19
Reniform: kidney-shaped.
Rêvi 19
Revolute : having the margin or apex rolled outwards and downwards.
Rhizophoraceæ 68
Rosewood 137
Roṭṭaipalâ 94
Rotundate leaf : a leaf somewhat less than circular in outline.
Royal wine palm 194
Rudraganapa 43
Rudrakaḍapa 43
Rudrâksha 12

S

Sacred fig 88
Sadarakalli 76
Sâga 48
Sago palm 194
Saint John's thorn 164
Sâle 174
Sâli 174
Samara : a fruit which is provided with a wing developed from the pericarp, is dry and does not open to set free the seeds.
Sami 165
Sandalwood 74
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Santanam 74
Sandanavêngai 111
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Sarakonnai 144
Saravâgai 162
Satinwood 129
Screwpine 192
Seaside grape 71
Segappusandanam 111
Segment: equivalent to lobe.
Sela unjal 177
Semban 135
Sembolagu 10
Semecarpus anacardium 22
Senkiḷuvai 123
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Senkoṭṭai 22
Sepal: one of the modified leaves which constitute the calyx.
Serrate: applied to the margin of a leaf when it has teeth pointing forwards like those of a saw.
Sesbania Ægyptiaca 135
Sesbania grandiflora 134
Sessile: applied to leaves, flowers, etc., which have no apparent stalk.
Sevappu âgatti 135
Sevappu maṇḍâre 101
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Sîma pûvarasu 84
Sîma rêla 145
Sîmasunkêsala 162
Sîma tangêḍu 143
Sîma tumma 164
Sîma vâgai 179
Simple leaf: a leaf which consists of a single stalk and blade.
Sînapalâ 94
Sînivêlan 164
Sîsam 136
Sissu 136
Sîtâ 4
Sittagatti 135

Soapnut 130

Spadix: a flower-spike with a thickened axis enclosed in a sheathing bract or spathe.

Spathaceous: spathe-like, relating to a spathe.

Spathe: a large membranous bract sheathing a spadix.

Spathodea arcuata 149

Spathodea campanulata 154

Spathodea crispa 150

Spathodea stipulata 151

Spike: a racemose inflorescence differing from the raceme proper in that the flowers are sessile on the main axis, that is, are not attached to it by stalks.

Spine: a thorn originating from the wood and representing an aborted branch or modified leaf or stalk.

Spinescent branchlet: a branchlet ending in a sharp point and resembling a spine.

Spondias mangifera 133

Stamen: the male organ of a flower, consisting of the filament and anther.

Staminode: an aborted stamen, a stamen without an anther.

Standard: the large upper petal of a papilionaceous flower.

Stephegyne parviflora 43

Sterculia fœtida 189

Stigma: a portion, usually the apex, of the style which consists of cells modified for the purpose of fertilization; the place is commonly indicated by an enlargement of the style or other change in its form; sometimes the style is absent and the stigma on the surface of the ovary.

Stipitate: stalked; a stipitate gland is a gland borne on, or shaped like, a stalk.

Stipule: an appendage

of the base of some leaf-stalks; normally there are two stipules to each stipulate leaf and they are very variable in form; sometimes they resemble small leaves; sometimes they are triangular or bristlelike; sometimes they assume the form of thorns; sometimes they project from the base of the stalk; sometimes they amalgamate and lie along the twig between the bases of an opposite pair of leaves (then called interpetiolar); occasionally they form a complete ring (ocrea) round the twig. Stipules often fall off before the leaf is fully developed and are then called caducous stipules.

Stone fruit: a drupe, the inner portion (endocarp) of the pericarp forming a hard case (the stone) round the seed.

Strychnine 59

Strychnos nux vomica 59

Strychnos potatorum 61

Style: a prolongation of the ovary bearing the stigma.

Sub-opposite: nearly opposite.

Sulandu 45

Sumikkikây 158

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Sunkêsvaram 161

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Tella avisi 134
Tella maḍa 68
Tella maddi 23
Tellapoliki 83
Tella poṇuku 83
Tella tumma 173
Tênpûchimaram 12
Terminal leaflet: the odd leaflet at the end of an unequally pinnate leaf.
Terminalia arjuna (glabra) 23
Terminalia belerica 25
Terminalia catappa 26
Terminalia chebula 27
Têttân 61
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Tirugukalli (tirukalli) 78
Tirukanna maram 16
Tiyyanimma 18
Tôḍâgatti 137
Togaru 47
Torch tree 45
Torus: the floral receptacle.
Tree of strife 51
Trewia nudiflora 84
Tri-foliolate leaf: a compound leaf having three leaflets.
Trincomalee wood 16
Tri-pinnate leaf: a pinnate leaf in which the pinnæ bear secondary pinnæ (pinnules) on which the leaflets grow.
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Tulip tree 8
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Ulmus integrifolia 86
Umbrella tree 174
Unequally pinnate leaf: a pinnate leaf with an odd terminal leaflet.
Unequal-sided: used of a leaf or leaflet which has a greater expanse of blade on one side of the midrib than on the other.
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White Silk-cotton tree 185
Whorled: having three or more organs (leaves, boughs, etc.) inserted in the same plane.
Wild date 194
Wing: a side petal of a papilionaceous flower; a projection of the blade down the leaf-stalk; a thin, membranous appendage to a fruit.
Woodapple 119
Wrightia tinctoria 58

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